

THE
SYMPTOMATIC TREATMENT
OF
ASIATIC CHOLERA.
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TO THE TOXTETH-PARK CHOLERA HOSPITAL, DURING
THE EPIDEMIC OF 1849.

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ERRATA.

Page 18, line 1,—for augustia, read “angustia.”

Page 20, line 10,—for antem mullo, read “autem nullo.”

Page 65, line 32,—for ptyatism, read “ptyalism.”

INTRODUCTION.

The great uncertainty which prevails as to the nature and treatment of cholera, the various and opposite modes of treatment recommended, the vast importance of the subject, and the absorbing interest attending its investigation, may justify any one, of pretensions however humble, in tendering to the profession his mite of experience in the treatment of this terrible epidemic.

In attempting to do so, I feel conscious that I am boldly entering on the discussion of a subject which has again and again engaged the attention of men of distinguished talent, whose labours have long since thrown much light on the nature and the pathology of the disease; but, unhappily for mankind and for the credit of medicine, there has been, and there still is, so much of uncertainty in the principles of treatment recommended and commonly practised, that the public and the profession are equally at a loss, there not being a single indication generally admitted to serve as one fixed point on which to rest any principle of treatment. Even the experience of thirty years in India has not yet resulted in the establishment of any one generally acknowledged indication; and here in Europe, the second visitation of Asiatic cholera, after an interval of sixteen years, found

us still disputing about, not only the treatment, but even the nature of the disease.

Although this diversity of opinion among members of the medical profession may not have produced much evil in actual practice; although, in the hands of sound practical men pursuing withal various modes of treatment, an average number of cases may have been saved, still our want of union has been productive of great mischief, by lessening the confidence which the public ought to feel in the profession, and leaving, consequently, the more credulous a prey to the rapacity of mischievous and vulgar systems of quackery.

Under such circumstances, it appears to me to be the duty of every man who has, or who believes he has, arrived at any important conclusion, or has, in the course of his observations, discovered any valuable indications, at once to submit both them and the facts on which they are founded to the judgment of the profession. Long before the disease made its appearance amongst us I felt anxiously the responsibility which must inevitably devolve upon me when the epidemic should burst upon us. I often put to myself the question,—How should it be treated? I reflected upon its nature, and asked,—In what does cholera consist? I looked for solutions of these questions in authorities, and I found nothing but confusion. Some said it consists in a paralysis of the nerves of organic life; others, it is an intestinal flux, an aggravated form of common cholera; others called it an ague; others, again, maintained that it consisted essentially in a diseased condition of the

blood. I well remembered the teaching of the schools that, as to treatment, the experience of the last epidemic had left us completely in the dark, and that no particular remedy or line of treatment could be especially recommended; that the entire question was still *sub judice*: Dr. Watson comes to the same conclusion. In Dr. Parkes' elaborate work, so instructive as regards the pathology of the disease, we look in vain for indications of treatment based upon any distinct principle. The older Indian authorities stagger us by their bold recommendations of large bleedings, and the free use of calomel, which Dr. Parkes rather condemns. I felt the great difficulty of my position, and reflected long and carefully before I determined on any particular line of practice.

I was often asked,—What will you do with cholera when it comes? How will you treat it? I always answered, I do not know; when I see the disease I will decide.

To treat it other than empirically, I felt that we must have some starting point; some idea of distinct indications to be fulfilled. After referring to many works upon the subject, I was disposed to regard the epidemic more as a febrile disease than as a flux. With this feeling, I resolved to give a trial to Dr. Billing's plan, namely, tartar emetic with salines in small doses. In the beginning of the epidemic, I found this sufficient to control the disease in all cases, when commenced sufficiently early; but when the epidemic was at its height I could no longer trust to such simple means. Still regarding cholera as a disease essentially of a con-

gestive character, and knowing the practice to be sanctioned by high authority, I began to bleed ; and with how much success will appear in the course of this treatise.

Yet I cannot confidently put forward bleeding as a mode of treatment likely to save every case : for when the epidemic rages severely, many do not apply for relief until the time for bleeding, with any hope of success, has passed away. Moreover, unhappily, many cases break down with such frightful rapidity that treatment of any kind whatever seems equally unprofitable. The principal object of this essay will then be to point out what appear to me to be the true indications for bleeding, and to enforce them by a faithful detail of the cases, exhibiting the circumstances and phenomena which led me, eventually, to the determination of the several indications for bleeding, which, in the course of this treatise, I mean fully to describe.

As the treatment which I venture to recommend is founded on the febrile view of cholera, I have devoted a part of this sketch to a vindication of this view of the disease, one which I believe is beginning to be very generally admitted.

The relation of the cases, in fact, amounts to a sketch of the history of the epidemic, and may serve as a record of the Algid cholera, such as it appeared in 1849, in Liverpool. My fellow-labourers in this arduous field of practice will, I am confident, bear testimony to the accuracy of my descriptions, even though they may not be prepared to adopt my practice.

I commence with a description of the *post*

mortem appearances, as they were observed in many bodies that were examined, both in the hospital and among the out-patients; the next chapter I devote to the discussion of the pathology of the disease; in the third I have described the symptoms, and in the fourth chapter the successive stages of cholera; in the fifth I have endeavoured to give, as accurately as possible, a history of the treatment which was adopted, the results of it, and the conclusions which I have been led to draw from its success; finally, I have described a few circumstances which bear upon the contagious or infectious nature of cholera.

I am sensible that there will be found many imperfections in this sketch, for which I can only crave the reader's indulgence; fault may be found with the history of the cases, as not being sufficiently minute in detail, and with the descriptions as being too general. In apology for these faults, if faults they are to be considered, I can only urge that where I have generalized, it has been done from a wish to avoid tediousness; and where minuteness of detail appears to be wanting, it is either dispensed with to keep a work, intended to be simple, as free as possible from the cumbrance of useless and unnecessary repetition, or it is owing, in some instances, to the brevity of the notes—notes which were taken whenever a moment could be spared from the incessant turmoil of practice, by night as well as by day, for the several months during which the epidemic lasted.

I have to regret that it was not in my power to enrich this treatise with some microscopical

observations and chemical researches on the blood; but, unfortunately, it would seem always to be the fate of those to whom is presented the widest field of observation, to be so overwhelmed by the pressure of practice as to be necessarily deprived of that leisure which is indispensable to the carrying out faithfully of such delicate investigations.

To one oppressed at once by practice, both private, dispensary, and parochial, and to whom was likewise intrusted the superintendence of the cholera hospital to a populous township, (involving, in all, in the course of the last six months of 1849, the treatment of more than 3400 patients,) such leisure was necessarily denied.

Thus situated, it is with the greatest reluctance that I have taken up my pen and entered upon the labour of digesting and setting in order my scattered notes, a reluctance which nothing could have overcome but the conviction that it is in my power to throw some light upon the treatment of this formidable disease.

Liverpool, May 1, 1850.

CHAPTER I.

POST MORTEM APPEARANCES.

GENERAL ASPECT OF THE BODY, CHEST, LUNGS, HEART, ABDOMEN, LIVER, GALL BLADDER, SPLEEN, STOMACH AND INTESTINES, KIDNEYS, BLADDER, BRAIN AND ITS MEMBRANES.

POST MORTEM APPEARANCE. — GENERAL ASPECT OF THE BODY.

Cases ending fatally in the third stage, or that of collapse:—Countenance shrunk and ghastly; eyes deeply sunk in their sockets, half open, and surrounded by a very dark areola; nose pinched; mouth half open; lips frequently discoloured with sordes; in other cases exceedingly livid, (in those cases in which there had been profuse diaphoresis,) very pale. The skin of a purplish slate colour; that of the hands and feet sometimes of a brick coloured dirty hue, with the gorged blue veins appearing very distinctly on the brownish coloured surface: the fingers corrugated and contracted; the nails very blue; the rigidity of the limbs continuing for many hours after death, in some cases so long as sixteen or eighteen hours. In a few cases, one or two hours after death, violent spasms of the limbs were witnessed, which led the attendants to suppose that life was not yet extinct.

Cases ending fatally in the fourth or febrile stage:—The blueish colour of the skin not very apparent, except on the hands and feet; the fingers not corrugated; the areola around the eyes not very evident; the counte-

nance flushed and of a congested appearance. As the symptoms of collapse gradually give way to those of the character of low fever accompanying affection of the brain, the aspect of the body will present the appearance of the one or the other more or less, according to the length of time that the patient has survived the stage of collapse.

CHEST.—The lungs generally appear very much collapsed, and do not fill more than about two-thirds of the pleural cavities, are pale on their anterior aspect, and have a peculiar leathery and greasy feel, (this greasy feel was evident throughout all the visceral cavities.) On cutting into their substance, the texture of the lungs is found much closer than in the normal condition; they contain very little air or fluid, and the posterior or depending parts are in a half-solidified state, from the closeness of the texture and the gravitation into and coagulation of the fluids in such vessels as have remained pervious up to the moment of death.

Cases dying after suffering from fever for ten or twelve days:—The lungs less collapsed, and patches of incipient pneumonia detected in the dependant parts.

HEART.—Cavities on the left side empty, or containing clots of fibrine; on the right side, in cases fatal in the third stage, full of dark venous blood, the *venæ cavæ* and pulmonary arteries also distended with blood of the same character.

In cases dying in the fourth stage this accumulation of venous blood is much less marked, and the appearance of the whole organ is more normal.

ABDOMEN.—Liver generally healthy in appearance. Gall bladder—(cases fatal in the third stage)—this organ always distended, with dark greenish coloured tenacious bile.

In some cases ending fatally in the fourth stage, the

gall bladder was found full of a pale albuminous fluid destitute of any appearance of bile.

SPLEEN.—This organ generally presented a normal appearance.

STOMACH AND INTESTINES.—These organs in general presented no character which appeared to belong especially to the disease, except in their contents. Some casual differences were observed in several cases, but in nearly all the cases these appearances were identical with those presented by that case from which the following account is taken.—*Case Book, page 64.*—"The stomach was pale and contracted; the intestines were partially inflated with gas; the ileum of a dark livid red colour; the other intestines pale. Internally the mucous membrane was generally very pale, except in long congested patches in the ileum and smaller patches in the large bowel. The small gut contained some fluid of a starchy consistence and colour, mixed with some matter darker and more fœcal in appearance; the cæcum was full of fluid dark brown fœces; the colon contained the serum mixed with the starchy stuff as observed in the small intestines; the mucous membrane was for the most part flabby, and the glands appeared enlarged, particularly the *glandulæ agminatæ*."—This was a case that ended fatally on the ninth day. Fœcal matter had begun to appear in the stools. When cases ended fatally in the third stage the intestines contained only the rice-water effusion, and no fœcal matter.

KIDNEYS.—They were generally of a pale colour, particularly the cortical portion. Nothing abnormal was detected in the appearance of the supra renal capsules.

BLADDER.—Patients dying in the third stage, or early in the fourth, always empty and contracted. When the urinary secretion had been restored, its appearance was normal.

BRAIN.—CASES FATAL IN THE THIRD STAGE.—The sinuses of the durer mater are full of dark venous blood, the membranes and substance of the brain highly congested. In two cases small ecchymosed patches were observed on the pia mater. The same appearance has been noticed by Dr. Parkes.

CASES FATAL IN THE FOURTH STAGE.—The membranes, as well as the brain itself, were always found congested with dark venous blood, the arachnoid membrane was generally found adhering firmly to all parts of the pia mater, sometimes so strongly as to require the use of a scalpel to separate the convolutions; in some cases the fissure of Sylvius was perfectly obliterated by this membrane binding the anterior and middle lobes of the brain so firmly together, that they could not be separated without minute and careful dissection. The arachnoid was of a pale milky colour, here and there thickened and rendered opake by patches of effused lymph.

In all the cases fatal in this stage, in which the head was examined, the appearance of the arachnoid membrane was very striking. It was opake, of a texture thicker and stronger than in the normal state: it enveloped the whole brain, inclosing it as it were in a strong bag, binding closely together the convolutions and fissures. Its abnormal condition could be most plainly observed at the base, where lymph was abundantly effused, and generally a beautiful patch was seen extended across the pons varolii from the origin of the third pair of nerves to that of the olfactory.

MUSCULAR ADIPOSE AND SUBCUTANEOUS TISSUE, wherever cut into appeared dry, shrivelled, and very deficient in fluid blood; the larger veins were more or less filled with coagula, and drops of tarry grumous blood oozed from their cut extremities guttatim.

CHAPTER II.

INQUIRY INTO THE PATHOLOGY OF CHOLERA.

CONTRAST BETWEEN ALGIDE AND SPORADIC CHOLERA, AFFINITY BETWEEN CHOLERA AND CONGESTIVE FEVER.

This inquiry may be resolved into the following questions :—

1. Is this disease local or constitutional ; an affection of the intestinal mucous membrane, or a diseased condition of the blood or nerves, pervading the whole system ?

2. If the latter, is it or not a febrile disease ?

I believe these two questions, carefully considered, will carry us as far towards a true estimate of the pathological nature of cholera as we can expect to reach, until microscopical and chemical researches throw more light upon the intimate nature of the disease than they have yet done.

If cholera in its nature is local ; if it be an intestinal flux or catarrh essentially, how terrible are the effects produced by a comparatively trifling cause ! We find the blood blackened and depraved, respiration impeded, the brain congested, and, if the patient lives long enough, its membranes inflamed ; and all this referred to a degree of intestinal irritation which has not been locally severe enough to leave any, even the smallest, trace of inflammation. If such is the nature of cholera, it must be considered only an aggravated form of the common sporadic disease which is known by the same name.

Let us arrange, side by side, and compare the symptoms in either case.

MALIGNANT CHOLERA.

For a variable period, (it may be for two days or for only a few hours,) the patient feels languid, often a little chilly. During this time he may, or may not, have two or three or more loose motions, not by any means uncomfortable ones, but seeming only to give natural relief to the bowels. The countenance, if observed carefully, will be even now very characteristic of the disease, rather pale, the angles of the mouth slightly depressed; the eyes sparkle with an unusual degree of animation, but the whole expression of countenance is anxious. By and by the stools become incessant, the patient begins to vomit, but feels no pain; at length cramps begin in the hands and feet, extend to the thighs, but seldom reach the abdominal muscles. With the aggravation of the other symptoms the respiration becomes affected, the patient complains of constriction at the epigastrium and a stifling feeling; as the stage of collapse advances and increases in intensity, the discharges are prone to stop of themselves, but without any relief to the patient, who gradually becomes comatose, and dies of inflammation of the membranes of the brain.

SPORADIC CHOLERA.

The invasion is generally sudden; a patient may go to bed in ordinary health; at night he awakens, feeling violent colicky pains in the abdomen. He vomits profusely and is incessantly purged: at first his pulse is full and his skin hot, but by and by the excessive evacuations reduce the strength, the pulse becomes weak and small, cramps begin in the abdominal muscles and gradually extend to the arms and legs.

In severe cases the countenance sinks and becomes ghastly, and the skin blueish.

If the discharges are arrested and the pain subdued, the patient always recovers. If left without any treatment, he may die of exhaustion. But the case never runs into what is called consecutive fever. If there be any sequela it will be dysentery.

Here are several striking points of difference, an

difference not in degree, but in kind. We may even place them in contrast to each other.

MALIGNANT CHOLERA.

SPORADIC CHOLERA.

- | | |
|--|--|
| 1. Gradual but insidious access with premonitory symptoms. | 1. Sudden invasion. |
| 2. Skin cold from the first. | 2. Skin warm at first. |
| 3. No pain in the abdomen. | 3. Severe colicky pain. |
| 4. Cramps beginning in the feet, legs, and fingers. | 4. Cramps beginning in the abdomen. |
| 5. Death by intense collapse or inflammation of the brain and membranes. | 5. Death by exhaustion. If any sequela, dysentery. |

Besides these points, I have observed that the spasms of the limbs of cholera patients are more tonic in their character than the spasms of sporadic cholera, which are more decidedly clonic; but as this is only a difference in degree, I do not dwell upon it, but merely notice it incidentally. The striking symptoms of malignant cholera, as the *vox choleraica*, the extreme collapse, &c., I do not notice here, because it may be urged that these are differences only in degree.

The experience of treatment affords another argument in favour of the distinct nature of these disorders. Sporadic cholera can be always cured by a few doses of calomel and opium, combined with stimulants when there is much depression, while in Asiatic cholera, calomel and opium (as a combination) is comparatively useless, and stimulants decidedly injurious.

Those who hold malignant and sporadic cholera identical in nature, and only different in degree, maintain, also, that the malignant form has been frequently witnessed in Europe, and accurately described by the ancients. Sydenham is often quoted; but it has always appeared to me that Sydenham only described a severe form of our common autumnal bilious cholera. He describes it thus:—"Adsunt enim vomitus enormes ac pravorum humorum cum maxima difficultate et

angustia per alvum dejectio ; ventris ac intestinorum dolor vehemens, inflatio, et distentio ; cardialgia, sitis, pulsus celer ac frequens, cum æstu et anxietate, non raro etiam parvus et inæqualis, insuper et nausea molestissima ; sudor interdum diaphoreticus ; crurum et brachiorum contractura ; animi deliquium ; partium extremarum frigiditas ; cum aliis consimilis notæ symptomatis, quæ astantes magnopere perterrefaciant, atque etiam angusto viginti quatuor horarum spatio ægrum interimant.”

Here we have the distinctive characteristics of a severe attack of autumnal English cholera,—the pain in the belly, inflation and distension, the quick pulse and burning heat ; but where are the choleraic voice, the icy breath, and the shrunken features of malignant cholera ?

Sydenham goes on to describe how this epidemic was treated successfully by repeated doses of laudanum. Experience has taught us how little we can rely on opium for the cure of malignant cholera.

If Sydenham at all described the cholera such as we experience in the present times, it must have been in this place, for he distinguishes this as the epidemic from casual sporadic cases occurring at any time of the year other than autumn.

Again, he says,—“ Hic morbus, quantumlibet epidemicus, rarissime tamen, (quod supra dictum est,) Augusti, quo primum cæpit mense, terminos excessit.”

Asiatic cholera, on the contrary, seems in no respect influenced by seasons, as we have seen it rage with equal severity amid the snows of a Russian winter, and under the bright sun of a Parisian summer. In Great Britain, it was felt with about the same degree of severity in Scotland in the depth of winter, and in Liverpool at midsummer.

What Sydenham describes as cholera sicca, appears

to be nothing but flatulent colic. “*Est etiam et cholera sicca a spiritu flatuoso supra et infra erumpente, idque sine vomitu vel secessu.*”

I am not singular in this opinion, which I venture to advance, on the kind of cholera which Sydenham described, as the following passage from Annesley’s work on the diseases of India will show. After stating his belief that Sydenham had only described a severe epidemic of the common cholera, and that common sporadic cholera even in India differed essentially from the epidemic disease, he concludes his observations with the following inferences:—“That we have no satisfactory proof of the previous existence of a disease in all respects the same as that which has recently ravaged India; that this malady is in many respects different from the cholera morbus of Europe, and in a few from the sporadic cholera of India; and finally, that the cholera morbus of Europe more certainly, and the common cholera of India, as far as we have the means of judging furnished us, have never assumed features which resemble, in every particular, those possessed by this epidemic.”

Dr. Chambers has collected a number of descriptions of cholera from the old authors, from Hippocrates to Sydenham and Morton, many of which seem to depict the Algide cholera, but they all speak of abdominal pain as a prominent and early symptom. Certainly not one of these authors appears to have discriminated this disease from common bilious cholera; if they did witness it, which some of them probably did, they confounded it with common cholera; in fine, the Algide cholera, (if existing before 1817,) at least until that period, was not described as different from bilious cholera any more than scarletina three centuries ago was distinguished from measles.

He quotes, from Morton's treatise on fevers, a description of an epidemic fever which certainly bears a very striking analogy to cholera. "Sic ubi præ gradu veneni spiritus adeo perculsi sunt, ut a primo ictu sese iterum multatenus expandere valeant, algor qui primum horum paroxysmorum insultum comitari solet, cœque protrahitur, donec æger deliquiis frequenter recurrentibus confectus, tandem fatis cedat. Interea remedia intus vel extra ad flammam vitalem resuscitandam incassum applicantur; febris autem nullo indicio ex urinâ temperie vel pulsu accuratissimo observatori sese prodit — æger præ atroci dolore perpetuo alget, atque deliquiis, frequentibus suffocationibus et vomitionibus fatigatur sine aliquâ notâ febris evidenti, sine pulsu moribundus jacet."

If not the true Algide cholera, this was a fever of a strong choleraic type, and Morton's description fully justifies our considering whether Algide cholera is not a true congestive fever, perhaps appearing at different periods, and each time varying in its type as the common continued fever of this country does in its annual visitation.

Careful analysis by several chemists have proved that the blood of cholera patients possesses distinct characteristics; this being the case, the disease necessarily pervades the whole constitution in its progress, whether the first impression of choleraic poison be made on the blood, the nerves, or the intestinal mucous membrane.

When the disease pervades the whole constitution, should it be placed in the category of febrile diseases? Opinion appears to grow in favour of this hypothesis. If Morton did really witness an epidemic of Algide cholera, he has described it as a fever.

Mr. Dendy, as reported in the *Medical Gazette*, submitted to the Medical Society (November 19, 1849) some aphorisms on cholera, which do not appear to

have been received with any dissent, among which we find this proposition :—“It (cholera) is the first stage of Adynamic fever; because this fever in varied degrees is constantly developed on the subsidence of the flux.”

Dr. James Johnson, in his work on tropical diseases, though he does not class cholera among the fevers, reasons on its treatment as if he considered it allied to them. When enforcing the necessity of bleeding in the congestive fevers of those climates, he says, “the utility of venesection in even the congestive cholera of India, when the blood can scarcely be got to flow from the veins, has been proved beyond all cavil or doubt.” He also quotes from Dr. Lind the description of a congestive fever which seems to have presented much of the character of cholera. “*Vomitibus et dejectionibus tamen plerumque albi coloris erant, calicis aquæ commistæ, vel lactis illius quod lactentes evomunt.*”

The great objection to the admission of cholera Algida being a true fever, seems to lie in the anomaly of the great length and extreme severity of the cold stage; “*sine aliquâ notâ febris evidenti; sine pulsu moribundus jacet.*” But this character is not peculiar to the onset of choleraic fever, as the following extract from Dr. Clark’s description of the congestive fever of India, witnessed by him, will show :—“In whatever form the disease appeared at first, the pulse was small, feeble, and quick, the pain at the stomach increased, and the vomiting continued. As the paroxysm advanced, the countenance became flushed, the pulse quick and full, the eyes red, the tongue furred, thirst intense, headache violent, delirium succeeded, and the patient became unmanageable; but a profuse sweat breaking out, in twelve or fourteen hours generally mitigated all the symptoms.”

The same phenomenon frequently occurs in the most malignant form of scarletina, when patients die in the

first stage in convulsions or in collapse. In the epidemic scarletina of 1848, many cases proved fatal on the third day. I met with two which ended fatally on the second day.

Any one who has adopted, or ever seen practised, the use of venesection in cholera, must be struck with the great analogy between the results induced by bleeding in cholera and the description given by Dr. Armstrong of the effects of bleeding in the congestive typhus which prevailed in his day :—"The action of the heart is often so much overpowered in the first instance that the blood merely trickles or oozes from the punctured vessel for a considerable time, being much darker and thicker than natural. Yet, when a few ounces are drawn, it usually flows with freedom, and becomes finally of a brighter colour. Occasionally I have stood over a patient nearly half an hour before a stream of blood could be obtained from a vein, but at last it gushed out in a full current, and was not so easily restrained as in ordinary cases."

Cholera Algida being admitted to be in its nature a fever, the question then arises whether it be one of intermittent, remittent, or continued type.

Mr. Charles Bell, now of Manchester, who witnessed the progress of cholera Algida in the East, considers it an intermittent, and recommends bleeding in the cold stage.

Dr. Laycock, of York, in a lecture published in the *Medical Gazette*, during the prevalence of the epidemic last summer, argues with great ability for its being considered as a typhus, and, indeed, terms the disease Indian typhus.

The strong analogy which it evidently bears to the low form of fever described by Morton, and the congestive typhus of Armstrong, lead me rather to give it a place among the continued congestive fevers.

CHAPTER III.

SYMPTOMS.

SYMPTOMS.—In every disease, as well as cholera Algida, the stages described by authors are never so accurately delineated by nature: perhaps this is especially the case in cholera, for in those cases which pass rapidly from one stage to another, we find the symptoms characteristic of one period of the development of the disease prolonged into a subsequent stage, as cramps continuing in the stage of collapse, and the prostration and oppression of collapse continued into the febrile stage. Nevertheless, it is convenient, in the study of the disease, so to divide it, when the grouping of the symptoms permit of it, particularly if the doing so assists us in laying down the best indications to be fulfilled in treatment.

Keeping as closely as possible to the natural current of the disease, it would appear that it may be divided into four stages, each marked by very characteristic symptoms, and requiring decided modifications in the treatment pursued:—1. The Stage of **INVASION**; 2. The Stage of **SPASM**; 3. The Stage of **COLLAPSE**; 4. The Stage of **ENCEPHALIC FEVER**.

Throughout this sketch I have considered cholera as a disorder pervading the whole system, and we shall find, on collating the symptoms, that there is not an organ or function of the body which is not more or less disturbed, almost from the very outset.

I propose to arrange the symptoms under the following heads, viz.:—1. Those having reference to the **EXPRESSION**; 2. The symptoms connected with **SENSATION**; 3. With the **Function of CIRCULATION**; 4. With the **Function of RESPIRATION**; 5. With the **Function of ARTICULATION**; 6. With the **SECRETIONS**; 7. With **TEMPERATURE**; 8. With the state of the **BRAIN**.

1. **SYMPTOMS HAVING REFERENCE TO THE EXPRESSION.**—When an attack of Algid cholera is commencing, the character of the disease is stamped in the countenance from the very first; the face is pale with a slightly livid tinge, the brows are a little contracted, the eyes are prominent and sparkle with unusual brilliancy, the angles of the mouth somewhat retracted, the whole expression pensive and indicating anxiety, even though the patients may say that they do not feel any. If there is pain at the præcordia and difficulty of breathing, the anxiety of countenance is much more strongly marked, and great sense of uneasiness complained of. In many cases, particularly insidious ones in which there has been merely premonitory diarrhœa for a day or two, this group of symptoms is slightly marked; but still the choleraic character of the expression will not escape the eye of the practitioner who has carefully observed a number of cholera cases.

As the disease advances to the stage of spasm, the anxiety of countenance becomes more decided, the eyes are surrounded by a dark areola, and the skin assumes the blueish tinge. As collapse comes on, the face becomes Hippocratic, the eyes sunk in their sockets, the nose pinched, the cheeks fallen in, and the lips livid. In the stage of fever the wasted choleraic expression gradually disappears, the face becomes congested, the eyes particularly, and in cases where there

is very decided reaction, the countenance is even flushed.

2. SYMPTOMS HAVING REFERENCE TO SENSATION.—

In the majority of cases, at first, sensation is little affected ; yet there is in almost every case some sense of uneasiness and oppression about the præcordia, accompanied by more or less difficulty of breathing, in some cases this amounts to very severe pain. This is a very early symptom, and often precedes the premonitory diarrhœa, and is experienced simultaneously with the choleraic aspect. Pain in the abdomen is not complained of in severe cases, hence it becomes a favourable symptom as its presence indicates that the case is one of pseudo-cholera, or cholera merely ; when the pain is severe, the prognosis is always favourable ; in fact, abdominal pain and danger are to each other in an inverse ratio, for the greater the pain the less the danger, and the less the pain the greater the danger.

The stage of spasm is attended necessarily by great suffering, but the danger is not great in proportion to the violence of the cramps, for in the worst cases the cramps are slight.

In the stage of fever the senses are blunted, but the patient suffers from the disordered state of the functions of the brain. Children frequently, and sometimes adults, have convulsions. When the coma is not profound, they cry out and mutter incoherently from time to time.

3. SYMPTOMS CONNECTED WITH THE FUNCTION OF CIRCULATION.—

From the first the circulation is oppressed, and in the first three stages this oppression seems to be secondary to impeded respiration: the pulse is infrequent, slow, feeble, and often thready, always compressible. As to the number of pulsations in the minute, the variety is very great. In the com-

mencement the average is about 76 or 80. As the disease advances, and when the powers of life are taxed to the uttermost, the rapid and feeble efforts of the heart to force the circulation will sometimes raise the pulse to 120, or even 140, but it will be very thready, and scarcely perceptible at the wrist; but these cases form exceptions. The pulse is generally low throughout, and always in the fourth stage; it is then labouring, from the oppression caused by the diseased condition of the brain.

4. SYMPTOMS CONNECTED WITH THE FUNCTION OF RESPIRATION.—In very many cases the respiration is not sensibly affected in the first stage; yet there often is some difficulty of breathing, and a sense of tightness across the chest. These symptoms are well marked when the severe pain is felt at the præcordia. In every case, as the disease advances to the stage of spasm, the respiration becomes embarrassed, and often amounts to gasping for breath. In some cases the pain in the chest is agonizing, and shoots through to the back. It would seem to depend upon spasm of the diaphragm.

5. SYMPTOMS CONNECTED WITH THE FUNCTION OF ARTICULATION.—Very early in the disease the voice may be observed to be a little husky; it gradually sinks into a faint whisper, and becomes the peculiar *vox choleraica*; so peculiar, that once heard, it can never be mistaken again; in severe collapse it is at last almost inaudible; but in the stage of fever it gradually disappears with the other symptoms characteristic of extreme collapse. When the disease is ushered in by painless premonitory diarrhœa for two or three days, the *vox choleraica* is sometimes an early symptom.

6. SYMPTOMS CONNECTED WITH THE SECRETIONS.—The salivary glands are not affected until the disease has reached the fourth stage. At first the tongue is

moist and rather flabby, and free from any coating. In cases of cholera it has sometimes a brownish fur, and this symptom is favourable, indicating a case of less malignant character. In the fourth stage the secretion of the salivary glands is diminished, but the mouth and tongue never become so dry and parched as in a case of typhus fever. The diarrhœa, poured out profusely from the intestinal mucous membrane, is the most striking feature connected with this group of symptoms. The first stools are pale, loose, and frothy, often compared by the patients to barm: this appearance is evidently caused by the first rice-water discharges washing out the fecal contents of the bowels; by and by the discharges become pure rice water, they continue throughout the stage of spasm, and often cease spontaneously during the stage of collapse; this result being sometimes erroneously attributed to the large doses of opium with which the patient has been drugged.

Vomiting from the stomach generally comes on after the diarrhœa has existed for some time; nevertheless, it sometimes precedes it, but it always indicates the near approach of the stage of spasm. It is a very unmanageable symptom, very frequently persisting throughout the whole course of the disease.

The secretion of the liver seems to be quite suppressed; its returning functions indicate the subsidence of the disease.

The secretion of urine is completely suppressed as the patient reaches the stage of collapse; in the fourth stage it reappears.

The cutaneous secretion is not at first affected; the skin is dry and rather cool, (the patient often feels a little chilly.) By and by a cold clammy perspiration is poured out; this secretion always bears an inverse ratio to the quantity of fluid secreted from the bowels;

the more scanty the one the more copious the other ; and in the only genuine case of dry cholera which the author witnessed, (a case in which there was no discharge from the bowels whatever,) the clammy perspiration was most profuse. The prognosis is unfavourable in proportion to the amount of this secretion.

7. SYMPTOMS CONNECTED WITH TEMPERATURE.—Throughout the whole disease the surface is very cold, particularly that of the extremities, the forehead, and tip of the nose ; this continues in the fourth stage until decided reaction is established ; during collapse the tongue feels icy cold, and the expired air feels cold to the hand. In a few cases the author observed that phenomenon described by Dr. Parkes, of a peculiar warmth of the skin about the heart and upper part of the chest in advanced collapse, when the coldness of the rest of the body was excessive.

8. SYMPTOMS CONNECTED WITH THE DISORDERED FUNCTIONS OF THE BRAIN.—Those who consider cholera as a disease entering the system through the nerves, and making an impression on them prior to its exerting any influence on the blood, would probably seek for symptoms of affection of the nervous system in the first stage. But wishing to make this treatise, as much as possible, purely practical, the author rather refers this class of symptoms to the fourth stage. Doubtless, when the blood is poisoned to the extent to which we know it to be in cholera, we must admit that lesion of innervation exists to a great extent ; but of the nature of this lesion we as yet know nothing, and, in the first stage, the only indication we have of its existence is the languor and depression experienced by the patient ; in the third stage this depression increases to a very great degree, and becomes the most alarming in the stage of collapse. As the collapse gradually

passes into the stage of fever, the disorder of the nervous system gradually increases and becomes very strongly marked ; coma comes on, the pulse becomes labouring and is still very small, the eyes injected, the pupils rather contracted than dilated, but never in an extreme degree except in cases in which opium has been freely administered ; muttering delirium, great restlessness, constant tossing about, sometimes continually-repeated faint screams, or interrupted ejaculations, mark the progress of the cerebral disease. Finally, the coma becomes profound, and in some cases repeated attacks of convulsions occur of an epileptic character. [Convulsions of exactly the same kind were very common in the Irish fever of 1847.]

CHAPTER IV.

THE STAGES OF THE DISEASE

1. THE STAGE OF INVASION. 2. THE STAGE OF SPASM.
3. THE STAGE OF COLLAPSE. 4. THE STAGE OF ENCEPHALIC FEVER.

Having thus considered the symptoms of cholera separately, we may proceed to collate them and refer them to the different stages of the disease in which they are respectively presented.

1. THE STAGE OF INVASION is always marked by the peculiar choleraic expression of countenance, easily recognised by a practised eye, but difficult to convey an adequate idea of by description. However, the partial contraction of the brows, the brilliant sparkling of the prominent eyeball, the very slight depression of the under eyelid at the external angle, the somewhat retracted and drooping position of the angles of the mouth, all present in a greater or less degree, together with the pale and rather leaden hue of the skin, give the peculiar expression of listlessness with anxiety to the countenance. The voice loses its power; that is, the patient speaks in a lower tone than usual; but the faint *vox choleraica* of collapse is not yet to be observed.

These are the only pathognomonic symptoms of the first stage; but in nearly every case the premonitory diarrhoea exists; often vomiting is, too, an early symptom. Pain at the præcordia, and impeded respiration, are frequently early symptoms; in some cases the pain is excessive, and the respiration very much hurried, and

coupée. The pulse is small, but generally increased from ten to twenty beats above the healthy standard. Chilliness is experienced in a greater or less degree ; but is not excessive, and never amounts to a rigor. In a case of true cholera there is no pain in the belly ; while cholera prevails epidemically, many milder cases are observed, in which there is pain in the belly ; but these are cases of cholérine, and if cholera at all, the poison must have been imbibed in too small a proportion to induce the most deadly form of the disease ; in these cases, too, the skin is hot, the pulse full, and the stools, instead of being rice-water, are dark and foetid. As the second stage approaches, all the symptoms become aggravated ; the rice-water vomiting and purging is incessant, the voice becomes choleraic, thirst excessive, pulse feeble, and the body colder, and assuming the blue hue.

THE STAGE OF SPASM is merely intermediate between that of invasion, when the body is suffering from the first effects of the poison on the system ; and that of collapse, when the disease is fully developed and oppressing the system with its whole force. The cramps begin in the calves of the legs, and gradually extend to the arms, feet, fingers, and thighs, rarely to the muscles of the abdomen ; those of the neck, back, and face are never affected ; if collapse supervenes rapidly, the cramps are not so severe. (There are even cases without cramps at all.) As this stage advances, the choleraic voice and aspect become more strongly marked ; the vomiting and purging of rice-water discharge is incessant ; the extremities begin to get cold and blue ; the pulse becomes gradually more feeble ; there is intolerable thirst, in no wise relieved by drinking ; though the quantity of fluid given be ever so great, the stomach immediately rejects it with the rice-water discharges.

THE STAGE OF COLLAPSE begins soon after cramps are felt, but is not in general fully established for two or three hours, (it may even be five or six hours before it reaches its highest degree of intensity.) In treating of cholera, we must remember that this term of collapse has a very different signification from that generally assigned to it in medicine or surgery : for instance, there is no analogy between the collapse resulting from a severe bruise or surgical operation, or in a case of concussion of the brain—and the collapse of cholera. The former is a depression, a sinking of the powers of life occasioned by the shock experienced by the nervous system ; the cause has ceased to operate, but the effect produced (namely, the depression of the vital powers) continues for a longer or shorter period, until removed by the use of stimulants, or by nature making a rally and so setting up reaction. The latter is the continued oppression of the circulation and respiration by the action of a poison which, having entered into the system, continues its baneful influence until it is either subdued by remedial measures, or is worn out by the successful resistance of the natural powers. There is essentially as much difference between these two states as there is between syncope and apoplexy. There appears to have been originally, when the term was first used in describing the cold stage of cholera, a confounding of the two conditions.

Full collapse presents the following symptoms :—The choleraic aspect completely manifested, face lividly pale, brows contracted, eyes sunk and surrounded by dark areolæ, angles of the mouth depressed, cheeks hollow, nose pinched, the whole countenance sunk ; sense of oppression and pain about the præcordia, feeling of intense anxiety, and a sense of internal heat ; the pulse is increased in frequency, but gets smaller

and weaker, and at last cannot be felt at the wrist ; the breathing is short and interrupted, *sometimes* very frequent ; the voice sinks to a faint whisper ; the skin, particularly that of the forehead, neck, and hands, becomes bathed with a clammy perspiration, the whole skin assumes a blueish or leaden hue ; there is complete suppression of bile and urine ; the surface of the body is cold to the hand ; the tongue feels icy cold ; the expired breath is also cold to the hand ; the vomiting, purging, and cramps in some cases continue with more or less violence, but generally these symptoms are either arrested by this time by treatment, or stop spontaneously ; vomiting is the most persistent symptom of the three. The tongue is still clean and free from fur, but becomes very pale and flabby ; the lips are of ghastly paleness. Blood drawn in this stage has nearly the consistence of treacle, is of a very dark colour, and forms a grumous clot, which separates from the serum imperfectly and very slowly ; the surface of this clot exposed to the air oxidizes with great rapidity, and assumes a bright red colour, while that part of the clot not exposed to the air remains of a coal-black colour. The intellect is generally unimpaired, even in fatal cases, until the very last, except occasional wandering delirium from exhaustion of the vital powers. Not unfrequently patients become rapidly comatose before the symptoms referable to collapse have disappeared, but they die of oppression of the brain rather than of collapse.

4. THE STAGE OF ENCEPHALIC FEVER.—This fever, commonly called *consecutive*, I prefer considering a decided and essential stage of the disease ; now, calling it *consecutive*, implies that it is rather a casual complication or sequela of the distemper than a necessary part of the suffering and risk which every patient must

incur who is unfortunate enough to be affected with cholera. This opinion is founded upon a careful observation of nearly five hundred cases. We often hear of cholera being arrested in the first stage, by which is meant that people are cured who labour under the premonitory diarrhœa of cholera. Nothing can be more fallacious than such an idea; the fact is, that when cholera prevails epidemically, great numbers are affected with simple diarrhœa, and it has been found by experience, that persons under such circumstances are very liable to be seized with cholera; this diarrhœa may be cured by a dose of calomel and opium, a little laudanum and brandy, chalk mixture and catechu, or any other of the common remedies generally applied; but amongst these cases there will be, now and then, one not so easily managed; these simple means may check the diarrhœa; but after a few hours, or perhaps the next day, it will return with increased violence; it may be checked again, but it will return again, and if more decided means are not used, it will, indeed, soon prove to be a decided and malignant case of cholera. If such a case of premonitory diarrhœa, besides being treated with a view to arrest the intestinal flux, be also treated with the purpose of inducing reaction, by keeping in bed, giving antimony with or without opium, applying external heat, &c., so as to bring on a general warm perspiration, it will run the following course:—Reaction is early established, the stages of cramp and collapse are escaped by the patient, or they exist in a trifling degree, and the stage of fever sets in without violent symptoms; the pulse continues quick and sharp, and the face flushed, for several days; during this time the severe symptoms are very likely to be brought on by any imprudence on the part of the patient, such as

getting up and exposing himself to the air, or indulging in rich or indigestible food. But if, on the contrary, he keeps in bed, taking very little and very simple food, small doses of tartar emetic, and an occasional mercurial, the poison will gradually expend its force, and his health will soon be restored completely. In illustration of this position I may detail one case. A poor woman was seized with rice-water purging on Wednesday ; it was profuse, and her countenance was rather choleraic ; astringents were prescribed, and she was confined to bed. On Thursday morning the purging was arrested, she had perspired, and thought herself quite well ; contrary to the directions given to her, she got up in the afternoon, and by and by the purging returned with increased severity ; repeated doses of astringents again arrested the discharge. On Friday morning she was again much better, quite free from pain and uneasiness, but there existed a very slight degree of fever ; throughout this day she took small doses of tartar emetic and tincture of opium, and on Saturday morning she seemed quite well ; she was desired to stay in bed and take very little food ; nevertheless, in the afternoon she got up and busied herself for several hours about her household affairs ; a good-natured but officious neighbour brought her a veal pie and a pint of porter ; of this she made a hearty supper, and during the night was seized with violent vomitings, purging, and cramps ; at five o'clock in the morning was hopelessly collapsed, and died at one o'clock on Sunday. The history of this case teaches us, that by early and careful treatment the disease can be mitigated, and the fearful stages of spasm and collapse kept in abeyance, although the tendency constantly exists in the system to their full development, if any imprudence, whether of diet or otherwise, occurs, to call forth its action.

These are the real cases of premonitory diarrhœa, and they can always be recognised by carefully scrutinizing the countenance, for there will, certainly, the choleraic character be more or less strongly marked, and such cases should be always carefully discriminated from among the numbers of mere simple diarrhœa, which, in such times, apply for advice; for, most certainly, they will not yield to simple treatment, and always require careful watching for several days. By neglecting to consider them as sufficiently serious, many cases, which might be carried through the disease without either much danger or much suffering, are allowed to run on into cholera of the most malignant character. Such is the course of a case which receives timely treatment in the first stage; but if the patient has passed through the stages of spasm and collapse, the symptoms arising in the fourth stage are of a much more serious character.

As the circulation recovers some power, the face loses the choleraic cadaveric aspect; when there is decided reaction, the cheeks are sometimes flushed; the senses are blunted by the oppressed state of the brain; the pulse is perceptible at the wrist, but slow and labouring, very characteristic of cerebral oppression; the respiration returns to the normal state; the voice gradually recovers its ordinary tone; the skin becomes dry and the body warm, but the extremities continue cold for several days; indeed, they do not acquire a natural warmth until the patient is decidedly recovering. The tongue is at first moist, but, after the fever has lasted two or three days, becomes dry and furred, particularly when much opium has been administered; the urine is at first suppressed, its reappearance is a favourable symptom; in cases persisting for several days, the urine, though secreted, is sometimes retained, when it becomes necessary to use a catheter. The stools are

dark at first, and become bilious as the patient improves; if the case goes on unfavourably, they continue black or green, as usually observed in cases of inflammatory disease of the brain. The most important train of symptoms characteristic of the fourth stage are those connected with the disordered state of the brain; as the collapse passes off, the patient gradually becomes comatose, the pupils are rather contracted than not, but this contraction is nothing approaching in amount to the contraction caused by opium; the eyes are injected; there is muttering delirium; the patient can be roused to answer questions, but immediately after sinks again into coma. This state of the system being once established, the different cases vary as much in the minute detail of their progress as an equal number of cases of typhus fever would. Those which are rapidly fatal, sink soon into profound coma; in children, followed often by convulsions; this symptom more rarely occurs in the case of adults.

CHAPTER V.

TREATMENT.

INDICATIONS.—1ST. TO SUPPORT NATURE IN HER STRUGGLE TO CARRY THE PATIENT THROUGH THE ATTACK OF THE DISEASE. 2NDLY. TO GUARD AGAINST COMPLICATIONS IN THE FOURTH STAGE. BLEEDING RECOMMENDED; AUTHORITIES IN ITS FAVOUR; TABLE OF THE RESULT OF THE TREATMENT ADOPTED BY THE AUTHOR. STIMULANTS—THEIR VALUE, AND THE INDICATIONS FOR THEIR EMPLOYMENT; TARTAR EMETIC NOT ADEQUATE TO GRAPPLE WITH THE DISEASE. ASTRINGENTS.—PERSESQUI-NITRATE OF IRON. BLEEDING.—CASES TREATED. INDICATIONS FOR THE USE OF THE LANCET; 1ST, 2ND, 3RD, 4TH. CALOMEL, CAMPHOR, OPIUM. SPECIAL INDICATIONS AS THEY ARISE IN THE COURSE OF THE DISEASE.

It is in considering the treatment of cholera that we enter fairly on the practical part of the subject. On the threshold of the inquiry we may well pause and consider whether we can hope to discover any remedy, or conceive that we have discovered any which possesses a peculiar power over the disease? I would answer candidly that we have not; and, further, frankly confess my fear that we never shall; that in each succeeding visitation of this terrible scourge we can only hope that, by adopting and maintaining improved principles of treatment, we shall gradually increase the average of recoveries, and so, perhaps, materially lessen the mortality occasioned by cholera. Yet that still there will be a period during the prevalence of each epidemic when the poison will fall upon the people with such fell force that, in many instances, neither the strength

of nature nor the skill of art will avail to resist its deadly influence.

The object of this treatise is to promote this end, by encouraging the symptomatic treatment of cholera rather than the practice of trying first one specific and then another, and another, as each previous one is given up in disgust.

If we watch a patient through the course of an attack of malignant cholera, we perceive that he is the subject of two contending influences, as it were the theatre or battle ground of two opposed principles ; on the one hand we see the strong and too-often increasing tendency to death evinced by the shrunken features, whispering voice, cold extremities, clammy skin, pulseless wrists, and extreme nervous prostration ; under this deadly influence we see all the vital functions either perverted, destroyed, or, as it were, in abeyance, and the powers of life rapidly giving way and yielding to the overwhelming pressure of the poison on the system ; on the other hand, in every case which has not yet become quite desperate, we see the struggle of nature and the powerful influence by which she maintains against the disease a strong tendency to recovery, or, more strictly, by which she keeps up just strength enough in the patient to save the vital spark from extinction until the poison has exhausted itself and the disease has run its course.

During this mortal struggle, are not the indications plain?—to assist labouring nature, by mitigating the severity of the symptoms, and by maintaining the body in a condition, as well as can be, suited to the extent and extremity of the danger during the access and progress of the fever ; and finally, to guard against and obviate the danger of serious complications at its close.

Let us now consider how these indications are to be

fulfilled. In the preceding pages there is little that is novel, and, therefore, little likely to attract the attention of the profession ; but to what I am now about to advance, I would most earnestly entreat their attention. The wonderful results which followed in some instances the practice of depletion, induced me to adopt it very generally, and the result certainly answered my most sanguine expectations.

The strong prejudice which exists at the present day against bleeding for cholera—a prejudice with which I was as strongly impressed at the commencement of the late epidemic as any of my brethren—long stayed my hand. The *Medical Gazette*, in reviewing Mr. Bell's papers on this subject, says emphatically, "*we would hesitate to bleed in any case.*" This I felt to be the decided opinion of the profession ; and, influenced by it, I did hesitate to bleed for a long time, and, by that hesitation, lost lives which I now know might have been saved by bleeding, and which I believe could not have been saved by any other means that we are acquainted with.

Let it not be supposed that this is a novel and merely empirical mode of practice ; on the contrary, we have the highest authorities in its favour, and, in fact, this is only an attempt to revive a practice formerly well established and acknowledged to be founded on extensive experience, but now most undeservedly neglected or forgotten. In 1817, and for several years subsequently, bleeding was practised in India with the greatest success. Dr. James Johnson, in writing on the congestive fevers of India, says,— "The utility of venesection, in even the congestive cholera of India, when blood can scarcely be got to flow from the veins, has been proved beyond all cavil or doubt." The report of the Bombay Government, in 1817, informs

us "that the practice so judiciously and speedily adopted by Dr. Burrell in the 65th regiment, clearly proves that, at the commencement of the disease in Europeans, blood-letting is the sheet anchor of successful practice, and perhaps also with the natives, provided it be had recourse to sufficiently early in the disease, and as long as the vital powers remain so as to be able to produce a full stream, it ought, perhaps, never to be neglected. This practice was confirmed by forty official reports from various medical officers."

Mr. Colledge, speaking of the stage of invasion, says,—“When blood was drawn under these circumstances, it was dark, and the patient then invariably vomited, expressed himself wonderfully relieved, and always recovered.” On this subject we find the following observations in Annesley’s work on the diseases of India :—“That cases have occurred in which eighteen or twenty ounces of blood have been taken away, and the patient has died cannot be doubted, but in all these cases it will be found that the bleeding ceased after the vessels had been emptied, whether one or twenty ounces had been abstracted. On the other hand, it will likewise be found that if blood flows freely until the colour changes from black to red, the patient in general will recover.” Again,—“Although I recommend bleeding to be attempted at all times and in every stage of the disease, I am fully aware that many cases have recovered where it has not been used at all ; nor do I answer for its universal success, but I do venture to assert that if it can be accomplished in the early stage of the disease, and before the circulation has ceased at the wrists, in nine cases out of ten it will prove successful, especially if the colour of the blood changes from black to red, if the pulse get up and the spasms be relieved.” In confirmation of this opinion he gives the following account

of the crew of the General Harris, Indiaman :—" Nearly all the men who were attacked with this disease on board ship, and who were not bled, or from whom blood could not be drawn, died ; many of those who were bled, and who derived benefit, but whose subsequent treatment could not be closely watched from want of means, also died. Those men who were bled and sent to the General Hospital at Madras, (fifty in number,) where they could receive every attention, and had every means of accommodation, all recovered."

He, moreover, recommends forcibly the proper moment to be watched for bleeding when reaction is setting in.

Bleeding has never been tried in Europe to the same extent as it has in India ; yet, when the practice has been adopted, the report is generally favourable.

Hazlewood and Mordey, of Sunderland, mention their success in bleeding in some instances. " When acute pain was complained of in the small of the back, the abstraction of blood was highly beneficial ; in such cases, the pulse, which was small, thready, and hard, became soft under the operation. There is great analogy between this stage of the disease, and what Armstrong so well describes as mild congestive fever ; the two diseases requiring the same combination of remedies, usually producing very opposite effects, but in this instance uniting in one result,—enabling the oppressed heart to carry on the circulation, by diminishing the quantum of its labour, and by exciting the organ to more vigorous effects."*

Mr. W. Ainsworth also states that bleeding was practised a good deal in Sunderland in 1832, and found very beneficial.

* The combination of remedies which Hazlewood and Mordey refer to are, venesection and the exhibition of stimulants ; the former lessening the amount of the heart's labour, while the latter urges it to more strenuous exertion.

Mr. Greenhow, of Newcastle, bled successfully in several cases, but he does not seem to have adopted the practice generally.

Mr. G. H. Bell recommends bleeding very earnestly. —“ At first the blood flows very sluggishly, perhaps it is only procured by kneading the arms, but by and by the stream is more free, and as the blood flows it is improved in its colour, the patient feels the greatest relief, the pulse rises, and the colour of the blood testifies that the lungs are restored to their functions. Little else is necessary, the patient has a second dose of calomel administered to him, is left in a warm bed and falls asleep. It only remains to guard against local congestion and reaction; but in general, in a case treated as above, there is no such interference with recovery.”

Mr. C. Bell, in some articles in the *Medical Gazette* for 1848, has written very strongly in favour of this treatment, and the success of the practice, on which his opinion has been founded, appears to have been very striking.

His theory that cholera is an ague of quotidian type seems more questionable than the success of his practice. The opinion is now more general, and I think better founded, that cholera is more nearly allied to continued fever, or the congestive remittent of hot climates, and to such fevers of this country of congestive character as those described by Armstrong and Morton, as already quoted.

My own experience of the efficacy of depletion is comprised in the results of fifty cases; of these, forty-two recovered. During the epidemic 497 cases of cholera came under my observation, and, at first sight, it will appear strange that a practice so strongly recommended, was applied by myself in comparatively so few

cases ; but it must be remembered that a great number of these cases had occurred before I was fully satisfied of the great advantages of bleeding, that the epidemic had, in fact, reached its height before I had tried it in a sufficient number of cases to justify my adopting the practice generally ; moreover, many of the cases enumerated were not severe enough to call for heroic treatment, and, unfortunately, very many were too hopelessly collapsed, when first seen, for bleeding to be thought of, or if thought of, to be at all practicable.

I have arranged, in two tables, a summary of all the cases, the first table showing the great extent to which the disease prevailed among the indigent poor, and the excessive mortality among that class.

The second table exhibits the result of the different modes of treatment adopted.

TABLE SHOWING COMPARATIVE RATE OF MORTALITY.

	NUMBER OF CASES.	DEATHS.	RATE OF MORTALITY.
The indigent poor.	395	158	40 per cent.
People in comfortable } circumstances. ... }	102	17	16.6 per cent.

TABLE EXHIBITING THE RESULT OF TREATMENT.

TREATMENT.	CASES.	RECOVERIES.	DEATHS.	MORTALITY
Bleeding	50	42	8	} 35.2 per cent.
Calomel	72	30	42	
Stimulants	36	25	11	
Tartar Emetic ..	21	20	1	
Various	274	204	70	
Received no medi- cal treatment..	44	1	43	}
Total	497	322	175	

It is not meant that no remedy was employed in any of these cases but that indicated in the table, but that that remedy in each particular case was the one princi-

pally relied on for inducing reaction and bringing about a cure. Reserving to the last, as by far the most important, the two placed at the head of the table, namely, bleeding and the administration of calomel, I will briefly discuss the others, and giving to each its due merit, dismiss them in a few words.

Stimulants were generally administered to infants, and to those adults in whom syncope, with rapid sinking of the powers of life, were prominent symptoms, and where there was not excessive blueness of the skin.

For adults we found good whisky to be retained on the stomach better than any thing else ; we gave with it a mixture of chloric ether, aromatic spirit of ammonia, with tincture of opium and carbonate of soda

To infants we gave chloric ether, aromatic spirits of ammonia, with very small doses of compound tincture of camphor. Besides, mustard sinapisms and external heat were also put in requisition most assiduously. In infants under two years of age it was always decided by the second or third day. By that time they were either convalescent or moribund. In the worst class of cases where collapse was imminent, and the skin getting very blue, we found stimulants generally productive of mischief ; nevertheless, in the fourth stage, when the patient had to labour through the course of a tedious low fever, it was often necessary to give them very freely. Though not applicable to every case, or to all the stages, still, in the treatment of cholera, stimulants are not by any means to be neglected ; but the proper moment for their administration should be carefully watched for.

The result of the treatment by tartar emetic is rather delusive, and requires explanation. These twenty-one cases were treated on the plan so forcibly recommended by Dr. Billing. In fact, the treatment by bleeding is

only carrying his principle one step further; but all these cases occurred in the beginning of the epidemic, previous to the month of June, up to which month there were few fatal cases at the south end of the town; however, when the disease became more virulent, tartar emetic proved quite inadequate to contend with it; calomel I had recourse to generally, and bleeding occasionally, until I became satisfied of the advantage of the latter, and thought that I had discovered the indications for its use. In those cases in which the tartar emetic was exhibited, the sickness was soon allayed, a warm perspiration induced, and the patients all recovered, requiring only in addition one, two, or three alterative doses of calomel or castor oil during the few days of slight fever which followed the abatement of the first alarming symptoms. These were not, however, severe cases; there was not collapse in any, although it was impending in some, except the one fatal case, the particulars of which I will give by and by. I am convinced that antimony possesses considerable power over the disease, and is a valuable remedy in the treatment of cholera, but it cannot be relied upon in the malignant cases; if given in very small doses it is not sufficiently active, and if given in larger doses it depresses too much; still it is a useful adjunct, and will always, in small doses, contribute to the allaying of the sickness, even in cases which require, at the same time, the free administration of stimulants. It will allay the vomiting in every stage of the disease; but in the advanced stages the patients are often so much depressed that it would be imprudent to venture upon its use.

The case treated principally by antimony, and which ended fatally on the ninth day, I will refer to again, after discussing the question of venesection, because

I now believe that this patient might have been saved by the abstraction of blood at the critical moment.

We have next on the table 274 cases whose treatment is set down as various. The relative mortality under this head is not so great as that under some others, but that is not to be ascribed to the efficacy of the treatment, because, except the twenty milder cases treated by tartar emetic, all the less severe cases come under this heading. A great many of these cases were of this character; the rest were treated before I made up my mind to bleed generally, or were too far gone for bleeding to be had recourse to with any hope of success.

These cases were treated for the most part on the following plan :—External heat was applied as assiduously as possible to the surface, to the feet and legs particularly, and a large sinapism applied to the chest and abdomen, and an astringent mixture prescribed; we generally gave the following :

R. Sol. Fer. p. ses. q. Nit. unciam.
Tr. Opii, fd. drachmam, cum semisse.
Eth. Chlo., fd. drachmas duas.
Aquæ, uncias sex. cum semisse.

M.

For an adult, one tablespoon every quarter of an hour until the purging ceased. When this was taken steadily it always arrested the purging, generally when two or three ounces were taken; the vomiting did not always cease so easily.

As many of the druggists do not keep the sesqui-nitrate of iron ready, we were often obliged to prescribe the muriated tincture instead; this was sufficient to arrest the purging, but did not agree with the stomach so well as the nitrate; we found this mixture very efficacious in the treatment of the hundreds of cases, of premonitory diarrhœa, which applied for timely relief. For

those cases which began with griping pains in the belly and with discharges more fecal than rice water, we gave pills of calomel and opium from the first, instead of the astringent mixture. Other astringents were tried, but none relieved the symptoms so quickly or so decidedly as the nitrate of iron. If the vomiting continued after the purging ceased, small doses of tartar emetic, the tenth or twelfth of a grain, were exhibited at intervals; when, from the extremely depressed state of the patient, I dared not continue the exhibition of tartar emetic, calomel given in large doses, from a scruple to half a drachm, in almost every case, arrested this troublesome symptom. For this use of calomel we have the authority of Dr. J. Johnson, who says, "I shall prove in the course of this essay that twenty grains of calomel will act as a *sedative*, and so far from griping and producing hypercatharsis, it will soothe uneasiness and rather constipate than purge." In the advanced stage of the disease, this symptom was often controlled by doses of acetate of lead, with small doses of opium. In one very obstinate case, a blister applied to the epigastrium had a very good effect.

After the purging had ceased, small doses of calomel were generally given at intervals, through the stage of collapse and fever until the gums were touched. During the febrile stage, blisters were often applied to the back of the neck and sinapisms to the feet. In the worst cases the head was often shaved, and in children, tartar emetic ointment applied over the head instead of blistering, and with very good effect.

In all those cases which were at all serious, it was necessary to give mercury until the gums were decidedly touched.

There were forty-four cases which were not treated at all, some of them were found in a state absolutely

moribund, others refused to submit to treatment from ignorance or obstinacy, and in some cases, were denied it by the neglect and drunkenness of their attendants. One of these cases recovered, it was a malignant case, but not one of the very worst stamp; the woman had a very tedious recovery from the febrile stage.

The propriety of permitting patients to drink freely of cold water has been very much canvassed; many condemning the practice as most injurious, while some men of considerable experience recommend it. The inclination to drink incessantly is so strong, that we had many opportunities of observing its effects. It very much aggravates the vomiting, and the patient's thirst is never allayed in the least; while it is permitted, there is no use in giving any medicine, because it is immediately rejected, and the patient gets worse and worse.

We found the thirst more alleviated by letting the patients sip a little from time to time; when very little fluid is taken into the stomach at once, it is possible to overcome the vomiting; but it *cannot* be restrained if the patient is allowed to drink *ad libitum*.

When we gave large doses of calomel to stop the vomiting, we generally withheld fluid for an hour after the dose was taken.

From what I observed of its effects, I would most emphatically condemn the practice of allowing the patients to drink abundantly either of cold water or any other fluid.

Of the fifty cases which were treated by depletion, eight ended fatally. These were all cases of the worst description; in some, bleeding was only had recourse to as a means of alleviating suffering, without there being any hope of saving the patient's life; nevertheless, in all the cases, the relief afforded was enough to

allow of some hope of recovery. After giving a brief sketch of these cases, I will detail some of the worst cases, which were treated successfully in this way.

CASE I.—April 16, 1849. J. M., ætat 47, was first seen at two, p.m.: was found in a state approaching collapse, his face hippocratic, eyes sunk, tongue and breath icy cold, voice husky and feeble, respiration embarrassed, sense of constriction and great oppression at the præcordia, twitches of cramps throughout the limbs, pulse eighty, very thready, cold clammy perspiration, bowels confined, vomiting continually small quantities of rice-water fluid.

R.	Anti. Tart., grana duo.	
	Potass. Acetat, drachmam.	
	Aquæ, uncias octo.	M.
	Cap. coch. mag. omni semi-horâ.	

There was no vomiting after the second dose.

Six, p.m.—Pulse ninety, and not so thready; otherwise little alteration. He was bled to eight ounces. At first the blood would hardly flow from the veins; gradually it came in a full stream. The blood was very black and grumous.

R.	Hydr. Chlo., grana quatuor.	Om. semi. horâ.
	Hot bricks to be applied all about him.	

Ten, p.m. Pulse 126, fuller and firmer; no vomiting; voice a little better; no cramps; bowels not yet acted.

17th. Eight, a.m. During the night he passed about eight ounces of pale urine; pulse 130, thready; bowels not moved.

To have an enema of turpentine.

One, p.m. The bowels acted once after the enema; pulse 126, very thready; the tongue a little furred, and not so cold.

R.	Potass Chlorat., drachmam.	
	Aquæ, uncias quatuor.	M.

To take a teaspoonful every quarter of an hour.

Eight, p.m.—There being no improvement, the chlorate of potash was laid aside, and calomel given in repeated doses.

18TH.—The bowels continued confined all day ; no cramps nor vomiting ; the calomel was continued at intervals ; in the evening a dose of castor oil was given ; in a few hours it passed from the bowels without bringing any stool, scarcely even any rice-water discharge. This day brandy was given from time to time.

19TH.—This day he became gradually worse, and died at 2 p.m.

CASE II.—June 13. M. A. C., ætat 13. This girl when seen had been vomiting and purging for several hours ; the pulse was small and thready ; collapse was beginning ; the features were sunk, and the extremities becoming blue ; severe cramps in the legs and arms. She was bled to four ounces : she was relieved, and did not feel the cramps afterwards. This girl was very ill, but the relief afforded by the bleeding was so marked that I entertained sanguine hopes of her recovery, but, unfortunately, she was very much neglected by her attendants ; her medicine was not given regularly, and no pains were taken to keep her warm. She gradually became comatose ; a blister ordered to the back of the neck was not applied. On the next day she died.

CASE III.—June 16. E. Bythil, ætat 35, a strong muscular man. This was a case of most malignant stamp. He went out to his work at six o'clock in the morning ; came home at 8 a.m., ill, purging and vomiting : was seen at 11 a.m. ; was then collapsed and blue, the oppression of the breathing very great. He was bled to eight ounces. This relieved his breathing, but he was not in any other respect improved, the colour of the blood did not change to red as it flowed.

This was one of those severe and rapid cases which appear to set all treatment at defiance.

He died during the night.

CASE IV.—July 3. J. T., ætat 84. This old woman, after being purged for several hours, was seized with vomiting and cramps : her voice was very faint and whispering, and collapse evidently fast approaching. She was bled to three ounces ; the blood became redder as it flowed : very decided relief was afforded ; the spasms ceased, the vomiting and purging abated, and she felt much easier. Old and feeble as this woman was, I believe she would have recovered if she had been tolerably nursed ; but having nobody about her who felt any interest in her recovery, she was very grossly neglected, and, becoming gradually worse, died on the third day of her illness.

CASE V.—September 2. P. G. The third day of his illness, collapse coming on, the skin very blue, pulse very small, cramps very severe, the purging and vomiting were abating ; calomel and opium had been administered pretty freely. He was bled to six ounces, the blood improved in colour as it flowed, and he was very much relieved ; the cramps continued, but were not by any means so severe. This was the only case in which the spasms did not yield altogether to bleeding. I attribute the failure to the bleeding not having been used early enough in the disease. The next day there was some appearance of reaction, but symptoms of cerebral inflammation came on rapidly, and he died on the seventh day from the appearance of the first symptoms.

CASE VI.—September 7. D. C., ætat 33. This man had premonitory diarrhœa the day before, and was taken ill of cholera during the night. He was not a robust man, but, in general, enjoyed good health.

This was a severe case without being one of the most malignant stamp. The vomiting and purging was profuse, the spasms violent, but the blueness of the skin was not excessive. He was attended during the night by a surgeon, who wished to bleed him in the beginning of the attack; this the friends would not consent to, and he was treated with hot applications and sinapisms, externally and internally, with muriated tincture of iron and opium; some calomel was also administered. At eight o'clock in the morning I was requested to see him to determine the propriety of bleeding even then. I found him very much prostrated, choleraic expression of countenance fully developed; spasms very severe; the pulse weak, thready, and over a hundred; the respiration labouring, the voice whispering; the vomiting ceased, but still some purging; the surface very cold; the intellects were clear and the skin was not very blue; these last were the only favourable symptoms. This was evidently *now* a desperate case. I gave my opinion that his life would have been saved if the surgeon's advice had been followed during the night; still I recommended a small bleeding to allay the severity of the spasms and to relieve the oppression of the circulation. Four ounces were taken, which afforded temporary relief; the pulse rose to 120, but did not become firmer. The spasms ceased, an enema of acetate of lead and opium was administered, and small doses of stimulants were ordered at intervals, and hot bottles of water were placed round his limbs. The relief was only temporary, reaction was never established, and he died that evening.

CASE VII.—Sept. 5, half-past twelve, p.m. Joseph Bolderston, ætat 39, was taken ill yesterday; he is now collapsed, surface of the body cold, hands washey,

tongue cold and moist, pulse perceptible and with some strength, vomits and purges very much.

Ordered sinapisms to the epigastrium and legs.

Hot bricks to be applied round the body.

R. Hyd. Chlo., semi-drachmam statim.

R. Mist. Pl. Acetatis, semi-unciam.

To be taken every time that he vomits. To have an acetate of lead enema.

He was also bled to eight ounces.

Eight, a.m.—Skin still cold, pulse has not fallen much, says he feels better, but no reaction is as yet established, the tongue is warm, he has been less purged and does not vomit. Has just passed a stool which is nothing but rice-water fluid.

To have one grain of calomel every five minutes.

Twelve, noon.

R. Quin. disulph, grana sex.

Acidi. sulph. dil., fd. drachmam.

Aquæ, uncias octo.

M.

Coch. mag. sæpe, sumendum.

He was expressing a desire for a bitter drink.

Eight, p.m.—Is not at all improved, is still cold, skin shrivelled and covered with clammy perspiration; has passed some dark watery stools without any smell.

To continue the quinine drink, with the addition of a little chloric ether and tincture of opium.

He ate a little bread and tea, and thought himself better, but seemed lower.

6th, eight, a.m.—He passed a quiet night and slept; in the morning had several bilious stools, but passed no urine; pulse scarcely perceptible.

Ten, a.m.—Vomited several times, after which he was evidently sinking. He died at twelve o'clock.

CASE VIII.—Sept. 6, half-past ten, p.m. Robert Jones, ætat 23, was taken ill yesterday; collapse is now approaching, pulse perceptible but very small,

vomiting and purging excessive ; he has felt spasms in the left leg ; tongue and extremities cold and the hands shrivelled.

R. Mist. Fer. Mur. uncias sex.
Capiat semi-unciam sæpe.

A sinapism to be applied to the epigastrium.

R. Hyda. Chlo., grana tria.
Opii., granum. Ft. pil.
Capienda om. semi horâ.

7th, five a.m.—Is now warm, and says he is better ; is still purged, but does not vomit so much.

R. Sod. Carb., drachmas duas.
Tr. Op., drachmam.
Eth. Chlo., drachmas duas.
Sp. Amm. Aro., drachmas duas.
Aq., uncias octo. M.
Capt. coch. mag. om. semi-horâ.

Ten, a.m.—Still purged, pulse much better, voice improved, skin warm and dry.

To have an enema of Muriated Tincture of Iron.

Ten, p.m.—He is now warm and his tongue dry ; pulse rather full and quick ; has slept nearly all day ; he complains of pain in his forehead and over his eyes ; the eyes are injected ; he is very thirsty ; has had several stools during the day, but very little vomiting.

To have a diaphoretic mixture, and to be bled to eight ounces.

8th, eight, a.m.—He slept all night ; the eyes are still injected ; the pulse is rather hard ; has passed several stools unconsciously ; is still lethargic ; he complains of no pain. He passed water this morning.

Ten, a.m.—Has vomited several times ; head no better. The hair to be cut off closely, and cold lotion applied ; also a blister to the nape of the neck.

9th manè.—Is rather better ; not at all sleepy ; does not vomit ; makes water ; pulse small and thready.

Vesperè.—Feels better, but is very low. To have

some of the mixture of chloric ether and ammonia.

10th.—Pulse very thready and weak. To have brandy and water to drink. To have, every fourth hour, two grains of blue pill, with two of the extract of hyosciamus.

12th.—He has been restless all night, with low muttering delirium; the surface of the body warm, but the arms, hands, legs, and feet very cold. Pressure on the epigastrium gives no pain. The bowels are open, but not freely; he makes water, and takes some food. To have brandy and water (hot) to drink; a sinapism to the epigastrium; a turpentine enema. Having vomited several times some dark grumous fluid, he was ordered a draught containing three drops of creozote.

Vesperè.—He appears better; is quite sensible, and asked for milk and porridge, which was given to him.

His head ordered to be shaved and cold lotion continually applied.

13th manè.—The creozote has partly allayed the vomiting, but he is troubled very much with hiccup.

He takes sixteen ounces of brandy, now, in twenty-four hours.

Vesperè.—He is still delirious, and does not answer correctly when questioned. To have a blister to the head, which is to be dressed with mercurial ointment.

14th manè.—Passed a restless night; was a good deal excited; the hiccup is still troublesome. To have a blister to the epigastrium.

Vesperè.—He is quite delirious. The stimulants to be continued, and half a grain of acetate of morphia, with six grains of hyd. cum cretâ to be given.

15th manè.—For an hour after taking the powder he had been quite outrageous, singing aloud and talking incoherently; but he afterwards became quiet, and slept till morning. He is now sensible and perfectly quiet.

To take whisky and water, and broth occasionally.

16 manè.—He has slept quietly during the night, and passed water freely; bowels not open.

Vesperè.—To have an enema of turpentine and oil.

17.—He is now insensible, and when roused does not answer questions correctly.

18.—Got out of bed several times during the night, on which account he was ordered a grain of acetate of morphia; after taking it he fell asleep, but in the morning appeared weaker; the skin of the body hot and dry; the tongue dry; the extremities very cold.

19th. He is evidently sinking. 20th. He died at seven, a.m. Autopsy twenty-nine hours after death.

External appearance. He was a well-formed, strong, and muscular young man.

Lungs.—On their anterior aspect they were rather pale, and had the greasy, sticky feel before-mentioned; on the posterior and depending parts they were very much congested with dark fluid blood, and on the right lung several spots like the commencement of pneumonia were observed.

Heart.—Natural in appearance.

Liver.—Healthy.

Gall-bladder.—It was filled with a clear, limpid, rather thick, serous fluid, having scarcely a trace of bile in it.

Stomach.—Normal, contained a little mucus; no trace of inflammatory action upon it.

Small Intestines.—They were darker than natural, with several patches of red and congested vessels, and towards the lower end the papillæ were much raised, and covered with mucus.

Large Intestines.—They contained a quantity of very dark and foetid excrement.

Kidneys.—Healthy.

Bladder.—Distended; contained about twelve ounces of clear urine. He had made about sixteen ounces the day before his death.

Head.—No blood escaped on cutting the scalp, or in sawing through the calvarium.

Dura Mater.—Normal.

Arachnoid and Pia Mater.—On the surface of the brain there is evidence of recent inflammation; the convolutions and fissures are bound together by effused lymph of an opake colour. It is rather soft.

Brain.—The substance congested.

These two last cases are reported by Mr. Thomas Bickerton, House Surgeon to the Toxteth Cholera Hospital.

Even in these eight unfortunate cases there is a partial success, which speaks in favour of the practice. In the first case we have an example of the most malignant form of the disease, that unaccompanied by evacuations from the bowels; yet this man held out for four days. If he had been treated with large doses of opium, (a common practice,) he would not have reached the evening of the second day. The second case, that of the girl, was a very bad one, the collapse was extreme; the improvement after bleeding was decided, but she was lost by the neglect of her mother, who was not a woman of good character.

In the third case there was partial relief; but no hope was entertained of this man's recovery from the first.

In the case of the old woman there was improvement quite decided enough to justify sanguine hope of her recovery; but as she was totally neglected by the people about her, she necessarily sank very fast.

In the fifth case there were two unfavourable circumstances: firstly, he was not bled until the third day of

his illness—in general rather too late; secondly, opium had been freely administered on the second day; the cerebral symptoms are generally more obstinate and severe in cases which have been treated in the beginning by large or frequent doses of opium.

The sixth case was lost by the bleeding being put off too long. It gave relief, but was not expected to do more.

The case of Bolderston was like the third case, a hopeless one from the first.

The case of Robert Jones was a very bad one; but his life was prolonged by bleeding, although it was not resorted to until the severe head symptoms were beginning. He was treated, too, with opium very freely at first, and this contributed to neutralize the good effects of the depletion.

Against these eight fatal cases there were forty-two recoveries, all severe cases, and many of them desperate ones.

These fifty cases, having been noted and observed with particular care, have led me to the following conclusions with regard to the use of the lancet in cholera, and I believe have taught me the true indications which point out the necessity for depletion in the treatment of this disease.

In the first place, there are many cases such as those of Bolderston and E. Bythil which will no more be benefited by bleeding than by any other sort of treatment. In such cases the poison seems to be imbibed to so great an extent as to make death the inevitable result from the first.

There are four decided indications for the practice of depletion.

1. During the stage of invasion. If the lancet is used in this stage there is seldom occasion to do much

more. Very few of the cases which were bled in this stage required to take calomel until the gums were touched. This early bleeding is both safe and desirable up to the end of the stage of spasm. Even when collapse is impending it is often signally serviceable.

2. When the patient is fully collapsed the utility of bleeding becomes very questionable, and, as a general rule, I fear little good can be hoped from it; nevertheless, there is a class of cases to which it seems particularly applicable. In some persons the first indications of the disease are so slight that they attract no attention, till, by and by, violent vomiting and purging come on suddenly. The first and second stages are then, as it were, masked by the rapidity with which collapse seizes the patient; severe pain is felt at the præcordia; the breathing becomes very quick and short; the pulse is small, and generally slow; the countenance is anxious, pale, and of a hue approaching to lividity; but in these cases the skin is not very blue. The powers of life are very much depressed, and stimulants require to be freely administered; when a vein is opened in the arm, as the blood flows the breathing becomes easier, the pain in the præcordia gradually subsides, and the patients, though perhaps hardly strong enough to speak, declare themselves relieved. The depression of the vital powers is so great that stimulants must be given freely, or the patient will die of exhaustion. The course of these cases gives us a clew to an explanation of the phenomena that occur in bleeding connected with the change in the colour of the blood.

At first the blood is thick and black, flowing very sluggishly from the vein; when two or three ounces are drawn there appears a little red current in the middle of the stream; gradually this increases, until the whole stream is of a more natural colour.

Now, respiration being imperfectly performed, and so allowing blood not sufficiently decarbonised to get into circulation, and the heart being oppressed by the accumulating quantity of black blood which presses upon its right cavities, present two conditions which we might naturally expect bleeding to relieve; first, by removing a part of the blood which presses upon the heart on the right side, it allows that organ on the left to push the circulation more vigorously; next, by the relief it affords the lungs, it admits of deeper and fuller inspirations being made; by these some blood, better oxygenated, passes at each stroke of the heart into the circulation. This blood, even after passing through the capillary circulation, still preserves a more normal character, and, being thinner, flows through the middle of the veins, till gradually the whole stream appears of a natural colour.

When the blood is restored to its natural colour, or before it is completely so, if the patient becomes faint, no more need be abstracted; the breathing of the patient will now be more natural, much more unfrequent, and when the faintness passes off the pulse will rise and be firmer.

3. A third indication arises at the period of reaction, and when the dangerous symptoms connected with affection of the encephalon are manifested; if depletion be employed in the early stage, this occasion for its use never arises; but in cases where the patient has been allowed to pass through the three first stages without recourse being had to the lancet, it is often the only means which can give any chance of recovery.

4. There is yet another indication for a cautious use of the lancet, namely, in cases in which the premonitory symptoms appear to yield readily to ordinary treatment, but recur at intervals, the patient in the meantime

being very much prostrated in strength ; the choleraic expression is not well marked, and the voice is little affected. In these cases there is always danger of collapse coming on suddenly, and a timely bleeding will avert it and bring about reaction quickly. In one case, in a very delicate woman, the abstraction of one ounce was sufficient to arrest the symptoms and effect a critical change.

The forty-two successful cases of bleeding may be arranged according to the following table:—

Cases bled according to the first indication	29
„ „ second indication	3
„ „ third indication	5
„ „ fourth indication	5
<hr/>	
Total	42

In illustration of the effect of depletion under these different circumstances, I will give, as briefly as may be consistent with an adequate report, the history of a few of the cases under each particular head.

CASES BLED ACCORDING TO THE FIRST INDICATION: THAT IS,
DURING THE STAGES OF INVASION OR SPASM.

CASE IX.—July 3. Thomas Howell, ætat 35, rather a delicate man, of sanguine temperament. Five hours before he was visited, purging and vomiting had began; they were now incessant, and he felt spasms occasionally; the choleraic expression was strongly depicted in his countenance; pulse 78, tolerably firm for a cholera patient. He was bled to six ounces; the relief was immediate; there were no spasms afterwards. A few doses of the mixture of nitrate of iron and opium was given, which stopped the purging.

4th.—To-day the purging returned rather violently, but was now bilious; but the secretions appearing depraved, calomel and opium was ordered at intervals;

three grains of the former and one of the latter three times a day. After the second dose the purging ceased.

5th.—This day the purging came on, and there was slight fever, the tongue a little furred, and the skin hot. The pills were continued, and a few doses of tartar emetic, with acetate of potash, given at intervals.

6th.—This day the fever was at an end: his gums were slightly touched: in two days more he was perfectly well.

Before this man was bled his situation was very critical, half an hour after he was bled I ceased to feel the least anxiety about him.

CASE X.—July 7. W. Masterton, ætat 29, was seen after being ill for two hours: profuse rice-water vomiting and purging; the spasms were beginning; his aspect choleraic, and the hue of the countenance leaden: pulse shabby, 78.

Venesection to four ounces. The relief was immediate; presently after, his pulse was fuller and 84. He was ordered the following mixture:—

R.	Anti. Tart., grana duo.	
	Tr. Opii., drachmam.	
	Pot. Acetatis, drachmam.	
	Aquæ, uncias octo.	M.

To take a tablespoonful every half-hour until the vomiting should cease.

After the third dose there was neither vomiting nor purging.

8th.—His pulse was 80, soft and full; skin warm; no inclination for food; a very slight degree of fever. He was ordered to take the mixture every three hours, and five grains of blue pill in the evening.

He subsequently took a dose of castor oil. In two or three days he was quite well.

CASE XI.—July 21. Sarah Platt, ætat 12. She was

sent home from school in the forenoon, on account of diarrhœa: she was first seen at two o'clock, p.m. She had been vomiting for some time, and had suffered severely from spasms for more than an hour: her extremities were very cold; countenance much sunk, with areolæ round the eyes; collapse evidently approaching. Venesection to three ounces. She was immediately relieved; she felt two or three spasms in her legs, and then they ceased altogether. A sinapism was applied to the abdomen, (I may here observe, that this was invariably applied in every case,) and heat applied to the limbs. She was too nearly approaching the state of collapse to venture on antimony, so she was ordered small doses of calomel at brief intervals; after taking a few doses the vomiting and purging soon ceased.

22nd.—This day she was slightly feverish, but there were no serious symptoms: she continued to take the powders of calomel at longer intervals: the kidneys acted freely.

23rd.—Bowels confined; as the disease seemed now to be completely controlled, she was ordered to discontinue the calomel and take a dose of castor oil. The next day she was quite well. Her mouth was not affected in the least by the calomel. She took about twenty-five grains.

CASE XII.—July 21. David Kendal, ætat 77. This was a very severe case, profuse rice-water vomiting and purging, severe spasms, choleraic expression strongly marked and skin very blue, and extremities very cold. He was seen early, and his pulse, though slow, was still of tolerable volume; it was about 74. He was bled to six ounces. A few doses of the iron mixture was then given, until the purging ceased: afterwards calomel at short intervals; on account of his age and

weakness a little whisky with water was given now and then. He was immediately relieved by the bleeding : there were no more cramps, yet two or three days elapsed before there was decided reaction ; as soon as the biliary secretions were restored, the calomel was laid aside ; his gums were not touched ; about the sixth day a diarrhoea came on apparently from weakness ; quinine, with a little morphia and whisky, with beef tea, being allowed freely, soon restored him, and on the ninth day from the attack he was quite well. This was one of the most decided cases which I met with. Had this old man not been bled, he would certainly have died collapsed in a few hours.

CASE XIII.—July 26. Robert Birkenshaw, ætat 28, a strong muscular man, of nervo-sanguineous temperament. When seen, he had been vomiting and purging for three or four hours ; the cramps were severe ; the choleraic expression was evident, but not strongly marked ; notwithstanding, collapse was impending, as appeared from the extent to which the nervous system was depressed ; venesection to four ounces and a half : immediate relief was afforded ; the spasms ceased, and the purging and vomiting abated. He was rather exhausted, and it was necessary to give whisky for two or three hours. A few small doses of tartar emetic were given, and two or three of calomel. He recovered in a few days, without one serious symptom arising. He was rather an unpromising subject, and at first I had great fears that the case would prove fatal. He certainly owed his life to the depletion practised ; but I will admit that this was a case which calomel, pushed to ptyalism, would *probably* have saved ; but if the cure by calomel was even certain, would not any one prefer a small bleeding, under any circumstances, to even a moderate salivation ?

CASE XIV.—September 1. W. Murgatroyd, ætat 41. When first seen had been ill eight hours. The purging and vomiting had been excessive. He still vomited quantities of rice-water fluid. The spasms were very severe; his expression of countenance very anxious; his hands and feet blue, his pulse 74 and small; collapse evidently coming on. He was a large, muscular, athletic man. He was very restless, tossing about the bed, and getting up to vomit every moment.

He was bled to five ounces; the change in the colour of the blood from black to red was well marked. He was immediately relieved, the spasms ceased, and the purging and vomiting abated.

He now lay quiet, so that warmth could be applied effectually to his legs and feet. Thirty grains of calomel were given at once, after which there was no vomiting. His pulse was 90 after the bleeding, and he felt faint. That night he was allowed a little brandy and water occasionally.

September 2.—This day reaction commenced, but was not decided. He was ordered small doses of antimony and acetate of potash at intervals of two hours. He made water in the forenoon.

September 3.—This day his skin was warm, and his pulse sharp and firm; reaction was now decided. He was ordered to continue the medicine he was taking the day before, and to take four grains of calomel.

September 4.—To-day he appears quite well, but has no appetite. At the end of three or four days more his appetite returned, and he became quite well, without requiring any more medicine.

CASE XV.—September 4, midnight. Charlotte Bolderston, ætat 37. This was the wife of Joseph Bolderston, (Case vii,) and admitted about the same time. She has been ill since morning, and is now almost fully

collapsed, pulse small, tongue cold and whitish ; surface of the body cold, thirst very urgent, vomiting continual and excessive, rice-water purging, voice choleraic, and spasms very severe.

To have immediately thirty grains of calomel, and an injection of acetate of lead and tincture of opium.

To take a tablespoonful of the astringent iron mixture every quarter of an hour, and to be surrounded with hot bricks.

September 5, eight, a.m.—The spasms in the legs being so severe as to make her scream with pain, and the pulse having risen a little, six ounces of blood were taken from her arm ; ordered a pill of calomel and opium, 3 grains and 1, and the following mixture :—

R. Sod. sesq. carb., drachmas duas.

Tr. Opii., fd. drachmam.

Eth. Chlo., fd. drachmas tres.

Aquæ uncias septem cum semisse.

M.

Sumat coch. mag. om. semi-horâ.

Twelve, noon.—After the bleeding, the cramps were much relieved, and she felt better, but was still a good deal purged. The injection of acetate of lead to be repeated.

Eight, p.m.—She has been comfortable since noon, and has had several ejections which are dark in colour, and smell very strongly. The skin of her hands is now returning to its natural state ; her voice and countenance are much improved ; she is quite warm, her tongue a little furred ; she has taken a little tea and gruel. To continue her mixture.

N.B.—The blood which was taken from her this morning has not separated into clot and serum ; it is one solid darkish red grumous clot without any serum.

6th, ten, a.m.—She has passed a good night, and is now decidedly better ; is very sleepy ; bowels not open ;

skin warm; voice nearly natural; no pain; not very thirsty.

R. Ol. Ricini, semi-unciam statim.

Two, p.m.—She has now become semi-comatose; is roused by speaking to her; she complains of no pain: she has taken no food to-day.

Empl. Lyttæ nuchæ applicandum.

Her hair to be cut off, and cold lotion applied to her head continually.

Ten, p.m.—She is not quite so comatose now; the oil has operated; she passed her stool in bed: she answers questions better, and will take some food.

7th, five, a.m.—She is still very heavy, but not so much so as she has been; has taken some tea and wine, but vomited almost immediately afterwards.

R. Eth. Chlo.

Sp. Ammon. Aro. (āā) drachmas duas.

— Camph., guttas viginti.

Aquæ uncias septem cum semisse.

M.

Coch. mag. sæpe sumendum.

Ten, a.m.—She appears better, but her pulse is weaker; she is warm, and complains of thirst; her breathing is slightly stertorous.

The head to be shaved, and cold lotion continually applied; to have whisky and water to drink, sinapisms to be applied to the feet and legs, and to be surrounded with bottles of hot water.

R. Liq. Ant. Tart., semi-unciam.

Potass Acetat., drachmas duas.

Sp. Eth. Nit., semi-unciam.

Aquæ uncias septem.

M.

Capt. coch. mag. omni horâ.

Ten, p.m.—She is not so comatose as she was in the morning, but is weaker; her skin is cold; she calls for cold water continually.

8th, eight, a.m.—Her pulse is a little better, and the skin warmer; she does not sleep so heavily, and is

easily roused ; pressure on the epigastrium gives pain.

Empl. Lyttæ capiti. applicandum.

Sinapis mus epigastrio applicandus.

R. Hyd. c. cretâ, grana sex.

To be given every hour.

Vesperè.—She has not been so heavy to-day, but complains of the blister. About eight ounces of limpid urine were drawn off by a catheter. She has had a dark stool. She is very low. To continue the stimulants.

9th, manè.—She is certainly improving ; she has taken some food and wine ; her pulse is better than yesterday.

Vesperè.—Her bowels have been relieved to-day.

September 10th.—She is better, but has not passed so good a night. She moans and sighs heavily, and is restless.

To continue the stimulants.

R. Pil. Hyd. grana tria ;

Ext. Hyosci. grana sex. ;

Camph. Gum. grana tria.

Fiunt pil. duæ ;

Statim sumendæ, et si opus sit noctè repetendæ.

September 11.—She has passed a better night. It was discovered that the vagina was in a state of inflammation, tending to sloughing and very painful. To have a wet warm cloth continually applied. Her gums are slightly touched.

Eleven, p.m.

R. Pil, Hyd. grana octo ;

Morph. Acetatis granum ;

Ft. pil. quatuor.

Capt. unam secundis horis, donec sopor supervenerit.

September 12th, manè.—Is very low this morning, and has been purged several times. To continue the stimulants, and to have wine and water to drink. Mouth rather sore.

R. Pulv. cretæ, co. c., op. scrupulum statim.

Vesperè.—Is much better, pulse stronger.

September 13th. To-day she is perfectly sensible, and is able to sit up a little.

September 14th. She improves rapidly; a small slough has separated from the vagina, and the sore is healing. She has a troublesome ulcer on the right leg, owing to the sinapisms.

From this time her convalescence was steady, and she was discharged quite well on the 24th.

CASE XVI.—September 8th. Jane Peers, ætat 37. Vomiting and purging of rice-water fluid continual. She suffered very much from spasms, and symptoms of collapse were appearing in her countenance, voice, and hue. She was bled to four and a half ounces; she was immediately relieved. This woman lay in a wretched garret, and had no one to attend on her but an infirm old man. Scarcely any thing else was done for her, and she recovered in a few days without a bad symptom.

CASE XVII.—September 8. Thomas Flockshaw, ætat 34. This man was of rather a weak constitution; when seen, he had been purged and vomiting for several hours; the spasms were severe; his extremities very cold, and collapse coming on. He was bled to four ounces; he was immediately relieved.

The iron mixture was ordered until the purging should cease. He took three or four doses.

September 9.—This day he was slightly feverish. He was ordered tartar emetic, acetate of potash, and tincture of opium in mixture.

10th.—During the night he had a gentle warm perspiration. To-day he was ordered a dose of calomel.

He was quite well in a few days, having taken nothing more except one or two doses of castor oil.

CASE XVIII.—September 10. J. Young, ætat 31. He had been ill all day, with excessive purging of rice-

water fluid; towards evening he began to vomit, and at night spasms came on. He was seen at 9 p.m. His face was very much shrunk; his feet cold; his pulse was 100, and very small. He was bled to six ounces; this gave him immediate relief, but he was weak after it; the purging and vomiting abated, but did not cease altogether; they afterwards yielded to the iron astringent mixture. There was no return of the spasms.

Eleven, p.m.—His pulse is now 120, and fuller; he feels tolerably comfortable.

11th, manè.—To-day there is decided reaction; his pulse is 90, and his skin warm.

Ordered tartar emetic and acetate of potash, in mixture.

For several days purging of offensive stools occurred from time to time, for which he had occasion to take a few pills of calomel and opium; but he became quite well without his mouth being affected in the slightest degree.

It would be unprofitable to multiply details by giving the particulars of every case. The other nineteen cases were all of the same character, namely, rapid recovery after bleeding in the first or second stage. Of all the twenty-nine cases, two only required calomel to be taken until the gums were touched; and both cases would have ended fatally if depletion had not prepared them for its more effectual exhibition. It must, then, be admitted that the successful issue of so many cases justifies my advancing the proposition, *that bleeding is always indicated during the first and second stages, even when collapse is impending.*

SECOND INDICATION: CASE.—Bleeding in collapse, when it comes on suddenly with quick and embarrassed respiration, sinking of the powers of life, and slow weak thready pulse. These cases are not frequent; we met with

examples, which all did well. Bleeding was always useful when there was intense pain at the præcordia and difficult breathing, but all the cases which were seen, except these three, were bled before collapse came on.

CASE XIX.—May 22, nine, p.m. Mary Monaghan, ætat 28. She was found in a state of extreme collapse, the cramps still very severe, the pulse scarcely perceptible, the action of the heart feeble and labouring, the respiration oppressed; she had been ill from the morning, somewhat purged, but not excessively; there had not been much vomiting. She was ordered sinapisms, whisky, and a mixture of chloric ether, soda, and tincture of opium.

Eleven, p.m.—The stimulants had had some effect; she had vomited once, but was not purged. Her pulse 56 and very small; the action of the heart laborious; the second sound scarcely audible; respiration 48 in the minute; faint and gasping inspirations; a sense of great weight in the præcordial region. The skin cold, except over the region of the heart, where it felt quite warm. [Dr. Parkes considers this a fatal symptom.] The choleraic expression of countenance was fully manifested; the only favourable symptom was, that there was not much blueness of skin. She was bled to four and a half ounces: the blood was very dark, but towards the end became redder and flowed more freely. She became very faint; the pulse fell three or four beats; the breathing became more tranquil, and fell to 36: though weak, she felt very much relieved. She was ordered to continue the whisky and stimulants, and to have external heat applied to the surface.

23rd, eight, a.m.—Reaction is now fully established; pulse firm, 66; respiration natural; no pain, skin warm, no stool or vomiting.

The urinary secretion returned during the day. In two or three days she was quite well, having taken nothing more but a little antimony and calomel.

CASE XX.—July 12, E. Hughes, ætat 35.—This case presented the same features as the last; the attack was more sudden; when visited, she had been in collapse about an hour. Her pulse was very weak, and could scarcely be counted; it was about 110; respiration very short and gasping, 60 inspirations in the minute. She complained of intense pain, and weight at the præcordia. She was bled to four ounces; the colour of the blood changed from black to red; her pulse fell to 96, and her inspirations to 15. It was necessary to give stimulants freely. Two hours after, her respiration was natural, and her pulse 100. She recovered in a few days, without any bad symptom appearing.

CASE XXI.—July 16th. S. Roberts, ætat 27. This was a case of exactly the same character, treated in the same way; viz.;—a small bleeding, and the administration of stimulants; when reaction was established, antimony and calomel were given for a day or two. His recovery was rapid.

When cholera visited these countries in 1832, it was observed that the blueness of the skin was no indication of the extent of the danger; that many cases were equally fatal in which there was hardly any blueness of the surface. I believe that these were cases of this character, and that they would not have been fatal if they had been treated by bleeding.

THIRD INDICATION: CASE.—Bleeding at the period of reaction, and when symptoms of affection of the brain begin to be manifested. We have five bad cases successfully treated in this way.

CASE XXII.—July 31st. Robert Crosbie, ætat 6. This was one of the very worst cases; when first seen

he was fully collapsed, his pulse could scarcely be felt ; the vomiting was incessant. The purging yielded to the use of the iron astringent mixture ; calomel was given in large doses, to relieve the vomiting, but in vain ; he was much too low for tartar emetic to be ventured on ; this symptom continued until he was decidedly convalescent, resisting creozote, soda, and hydrocyanic acid, acetate of lead and opium, which were all given in turn, for the purpose of allaying the irritability of the stomach ; each had for a time partial success ; a blister was applied to the epigastrium, which also afforded some relief. Head symptoms supervened early in this case ; in the evening of the first day they were beginning, and a blister was applied to the nucha. The next morning the head was worse, the eyes were injected, and the pulse could be felt more distinctly ; three leeches were applied to the head and allowed to bleed pretty freely ; they gave some relief to the symptoms, but very active treatment was required to carry him through ; his head was shaved, and cold constantly applied ; afterwards tartar emetic ointment was rubbed in until the whole scalp was covered with the characteristic eruption : calomel was regularly administered until the mouth became sore. Sinapisms were repeatedly applied to the legs and feet, and a second blister was applied to the nape of the neck. For several days he was given for drink brandy and water, and beef tea for food. A mixture, with chloric ether and spirits of ammonia, was continued as a stimulant, notwithstanding the obstinacy of the vomiting ; this was in some measure checked by giving him very little drink at a time. His mouth was not sore until the 5th day ; after this, he recovered steadily and quickly.

CASE XXIII.—July 31. M. Stowe, ætat 4. This child was first seen in the state of coma, with a very

small pulse ; the vomiting and purging had ceased for several hours. Two leeches were applied to the head, and calomel given at intervals of two hours. The leeches gave relief ; a blister was afterwards applied to the nape of the neck, which removed altogether the comatose symptoms. She was quite well in a few days.

CASE XXIV.—John Pye, ætat 6, admitted September 2. His father and mother had died of cholera this week. He is partially collapsed, voice weak and choleraic, vomiting and purging excessive. To take the iron astringent mixture, to have sinapisms applied to the legs and belly, and to be surrounded with hot bricks.

Eight, p.m.—Reaction is now fully established.

R. Hyd. Chlo., grana duo statim.

Venæsectio ad uncias tres.

3rd., three, a.m.—He is much better, but vomits a little still, skin warm, has slept quietly, and appears to go on favourably.

R. Vin. Ant. Tart., semi-unciam.

Sp. Eth. Nit., fd. drachmas duas.

Tr. Opii, semi-drachmam.

Aquæ uncias septem, cum semisse.

M.

Capt. coch. mag. omni horâ.

Three, p.m.—Continues to improve, and wishes to go home.

4th.—Has slept well during the night and taken his breakfast in the morning ; his tongue furred, pulse full, and skin hot and dry ; he does not feel any pain.

R. Sod. carb., drachmas duas.

Tr. Hyosci, fd. drachmam.

Sp. Eth. Nit., fd. drachmas duas.

Aquæ uncias quinque cum semisse.

M.

Capt. coch. mag. omni horâ.

5th.—Continues better. To continue the mixture, and have a dose of castor oil.

Vesperè.—He vomited frequently in the afternoon, but otherwise appears better.

[N.B.—The cause is not stated in the note book,—it was probably owing to his eating rather freely; convalescents, particularly children, were very apt to retard their recovery by irritating the stomach in this way.]

On the 7th he was discharged cured.

CASE XXV.—Francis Parry, ætat 18, admitted September 8, half-past one, a.m. He has had diarrhœa for four days; this night he became much worse, and vomited; he has had no cramps: he is very cold, his tongue cold to the touch, and he is very low.

To be surrounded with bottles of hot water; to have a sinapism to the epigastrium, and to take the astringent iron mixture.

Ten, a.m.—He is now much better, is not purged, and does not vomit, his pulse rather full, the tongue furred and dry, he feels his head heavy, and has some pain in the belly.

Sinapismus nuchæ applicandus.

R. Hyd. Chlo., grana decim statim.

R. Liq. Anti. Tart., fd. drachmas tres.

Sp. Eth. Nit., fd. drachmas duas.

Aquæ uncias quinque cum semisse. M.

Capt. coch. mag. omni semi-horâ.

Nine, p.m.—The coma is more decided; he has been in a state of lethargy all day; it is now difficult to rouse him; his pulse is full and strong.

Venæsectio, ad uncias sex.

R. Hydr. Chlo., grana quatuor. Fiat pulvis.

Mitte, quatuor. Capt. unum omni horâ.

9th, nine, a.m.—He is better, and not so heavy; his eyes are still very much injected; he has had several stools since last report, which are dark; he has made water, his tongue is clean and moist; he says he is much better.

Vesperè.—This evening he has hiccough, and has begun to vomit.

R.	Hyd. c. cretâ, grana sex.	
	Pulv. Ipec. Co., grana decim.	M.
	Fiat pulvis statim sumendus.	

R.	Sod. Carb., drachmas duas.	
	Sp. Eth. Nit., fd. drachmas duas.	
	Eth. Chlo.	
	Tr. Hyosci. āā, fd. drachmas tres.	
	Mist. Camph., uncias septem.	M.
	Capt. coch. mag., 2dis. horis.	

10th, eleven, p.m.—He feels better; takes his food now without vomiting.

Eleven, p.m.—He has vomited several times during the day.

R.	Pil. Hyd. grana duo.	
	Ext. Hyos., grana duo ft. pilula.	M.
	Mitte quatuor, capt., unam quarta quaque horâ.	

12th, manè.—He has passed a good night, but vomits still. To take two drops of creozote immediately, and, if necessary, to repeat it.

Vesperè.—The vomiting still continues. To take four grains of acetate of lead every half hour.

13th.—The acetate of lead stopped the vomiting; he is much better.

14th.—He continues to improve. 17th.—Discharged cured.

CASE XXVI.—John Kelly, ætat. 37, admitted September 20, half-past one, a.m. He had been ill of diarrhœa for a week; yesterday it became much worse, and vomiting began; the cramps are severe, the diarrhœa and vomiting excessive; collapse is rapidly advancing; his hands are shrivelled, the skin very much corrugated; the voice is choleraic, and the pulse small and shabby.

Sinapisms to be applied to the epigastrium and calves of the legs.

R. Hyd. Chlo., scrupulum. Statim.

R. Hyd. Chlo.

Sachari, alb. āā., drachmam.

Misce intimè et divide in chartulas duodecim.

Capiat unam omni horæ parte quartâ cum cochleario magno potûs subscripti.

R. Tinc. Opii., fd. drachmas duas.

Aquæ puræ uncias viginti.

M.

Ten, a.m.—He has had some bilious matter latterly mixed with his stools, and his skin is warm, but his pulse is very weak, and his voice husky; as yet he has made no water.

Ten, p.m.—His stools are now quite dark; he has made no water. To continue the powders, and to take the following mixture :—

R. Tr. Opii, fd. drachmas duas.

Sp. Eth. Nit., fd. drachmas sex.

Potass Acetatis, drachmas tres.

Aquæ uncias viginti.

M.

Capt. coch. magnum omni semi-horâ.

September 21, manè.—He has passed a pretty good night, and says he feels much better; his stools are now dark and foetid; he still vomits a little. Up to this day he has taken 230 grains of calomel.

To continue the powders, and now to take the following mixture :—

R. Anti. Tart., grana duo.

Sp. Eth. Nit., fd. drachmas tres.

Potass Acetatis, drachmas duas.

Aquæ uncias septem cum semisse.

M.

Capt. coch. magnum omni semi-horâ.

Noon.—His eyes have a peculiar bright appearance, and the pupils are contracted to a point; he is not comatose, but slightly delirious, and imagines he sees things about his bed.

Seven, p.m.—He is now getting out of bed, is quite delirious, his eyes are very bright and wild, the pupils so contracted as to be scarcely distinguishable. It was determined to cup him from the back of the neck; great difficulty was experienced in getting him to submit; finally he yielded, and six ounces of blood were abstracted. He became very faint, and for a time was pulseless; he rested better during the night.

22nd.—He is certainly more sensible; his pulse is full and of some strength. He has vomited several times. He has now taken 270 grains of calomel.

Vesperè.—He has rested quietly all day, and seems improving; bowels confined; to have a dose of castor oil.

23rd, manè.—He has been quiet all night and slept tolerably; he does not mutter so much in his sleep; he is tolerably sensible now, pulse rather full, skin warm; his eyes are still bright and shining, but the pupils not so much contracted. His bowels have been moved several times by the oil; he has made a little urine. He asked for wine, but none was allowed. He was ordered arrow-root for food, and toast and water for drink. To continue the powders and take the following mixture:—

R.	Liq. Anti. Tart., fd. unciam.	
	Tr. Opii. fd. drachmam.	
	Sp. Eth. Nit., semi-unciam.	
	Aquæ uncias septem cum semisse.	M.
	Capt. coch. mag. omni horâ.	

24th.—He has passed a good night, does not mutter in his sleep; he answers questions sensibly; tongue clean; vomiting quite stopped; urine still scanty.

25th.—Was so much better to-day that he walked in the garden. Had an anodyne draught at bed time.

26th.—His gums decidedly touched: he continues to improve.

27th.—His mouth very sore ; in other respects quite well.

October 2.—Discharged cured.

Of these cases, those of Crosbie, Parry, and Kelly were of the most desperate character, and it is quite obvious that they must have all ended fatally if the brain had not been relieved, by depletion, of the excessive congestion which oppressed it ; this depletion, at the same time, checking the progress of the inflammation of its membranes. Although the cases of Pye and Stowe were not so severe, yet their rapid recovery can only be ascribed to the timely use of the lancet in one case, and leeches in the other.

FOURTH INDICATION : CASES.—Bleeding in the first stage, when the symptoms partially subside and return insidiously, when the choleraic expression is not well marked, but the nervous prostration is considerable.

The first indication for bleeding embraces all cases up to the end of the second stage, when collapse is either begun or imminent, consequently this fourth indication is strictly included in the first, but I discuss it independently, because it has reference to a class of cases to which bleeding would, *primâ facie*, appear the most inapplicable treatment possible ; nevertheless, such an impression does it produce upon the disease, that the patient always goes on favourably afterwards. We can only account for this result by referring the nervous prostration to the oppression of the system, by the influence of the poison directly on the blood ; by withdrawing a small quantity of the circulating fluid, we occasion a more complete oxygenation and more ready flow of the remainder, whereby the nervous centres are immediately supplied with blood of a more healthy character.

There were five cases answering to these conditions.

CASE XXVII.—July 1. S. Banks, ætat. 8. This girl was affected with cholera, not in an extreme degree; the rice-water purging and vomiting was at first excessive, but was controlled by the astringent iron mixture. The next day she was pretty well in the morning, but in the afternoon the symptoms returned, and were attended with occasional spasms; her skin was not very blue, but she was very low. Calomel was given in small doses, repeated every half hour. This checked the symptoms again, and in the afternoon she appeared quite well: notwithstanding, the symptoms returned on the third day, attended with severe spasms, and imminent collapse. She was bled to three ounces, and immediately relieved. No further treatment was required, except one or two small doses of castor oil.

CASE XXVIII.—W. Windsor, ætat. 6. This case was exactly similar to the last; he was bled to three ounces on the fourth day. He recovered quickly from all symptoms of a choleraic character, but was annoyed with a consecutive diarrhœa, which lasted about ten days.

CASE XXIX.—July 18. J. Johnson, ætat. 33. In this case there was so much nervous prostration that I was deterred from bleeding in the first instance. On this day the discharges yielded to the astringent iron mixture.

July 19.—The stomach still continuing irritable, antimony and opium were prescribed; in the evening he was much better, but during the night he was taken much worse; the purging and vomiting returned, with cramps, and the general appearance of collapse coming on. He was bled to six ounces, and from that time no unfavourable symptoms arose.

CASE XXX.—July 21. Mrs. C., ætat. 28. The evacuations in this case were profuse, and the nervous

prostration was very great. The purging and vomiting at first ceased after two or three doses of the iron mixture were taken ; then returned after a few hours ; again yielded to the same treatment, and again, after an interval, returned. On the morning of the third day the treatment by calomel in frequently repeated doses was substituted ; at first the vomiting ceased and the purging was checked ; but in the evening both returned again with increased violence. She was now becoming weaker by degrees, and the choleraic expression of countenance was becoming much more decided. An attempt was made to bleed her ; when one ounce was drawn she became faint, upon which her arm was tied up ; a little brandy was given her, and the calomel treatment continued. In this case the change in the colour of the blood was scarcely appreciable ; likewise the relief afforded was not so well marked as in the other cases ; however, after this small depletion, she went on smoothly. No serious symptoms arose afterwards.

CASE XXXI.—August 11. Mr. H. T., ætat. 36. This day he has been affected with premonitory diarrhœa, and his countenance slightly indicates an approaching attack of cholera.

Ordered the astringent iron mixture, and recommended to stay in bed and keep the body very warm, that reaction might be induced.

August 12.—In the morning he was free from diarrhœa, and feeling better, he went out and spent the day as usual. In the evening the diarrhœa returned, and was again checked by the iron mixture.

13th.—This morning he looked ill, but could not be persuaded to give up business and go to bed. He had now no diarrhœa, but it came on in the evening, and was quite rice water. As yet there was no vomiting, and the symptoms were not urgent, though he began to

look very bad. Bleeding was proposed, but he would not submit to it.

14th.—This morning the purging had again ceased, still he looked worse, but would go out to business; during the day the purging returned, and in the evening it became excessive; he now began to vomit rice-water fluid and to suffer very much from cramps; his countenance was sunk, becoming livid, his pulse small and weak, his extremities at the same time very cold. His whole appearance was such as to lead me to fear that fatal collapse would very quickly ensue.

The length of time which had elapsed from the appearance of the first symptoms, the suddenness and severity with which collapse was setting in, the languor and weakness of the circulation, and the haggard ghastliness of countenance, altogether made the case a most unpromising one; and with more of fear than hope, keeping in mind the case of Mrs. C., (Case xxx—a very similar one,) I determined to bleed. Five ounces were abstracted; this gave immediate relief; the change in the colour of the blood was very characteristic; his respiration became easier, his pulse rose and became fuller, his countenance lost its anxious expression, and he only now complained of the pain occasioned by a sinapism which had been applied to the abdomen.

Very little medicine was administered after the bleeding; he took calomel and some antimony for two days that he remained in bed. It was not necessary to touch his gums.

It would be tedious to multiply details by relating the history of many cases; but for this reason I could give the particulars of several, which unfortunately ended fatally, but which, I now feel no doubt, a timely bleeding would have saved. I may be permitted to give three in illustration.

CASE XXXII.—December 18, 1848. Mary Owen, ætat. 45. This was the first case of cholera which came under my observation. She was seen this day by another surgeon, who found her, after two days' purging and vomiting, extremely depressed and nearly pulseless; she had not had spasms; he ordered her brandy and an astringent mixture of catechu and opium.

19th, mané.—She was not so low, but had cramps in her legs; the purging was checked.

Four, p.m.—I saw her for the first time; she presented the following appearance:—Countenance shrunk, a dark areola about each eye, tongue red, clean, but of icy coldness, skin dry and cold, pulse over a hundred, but so feeble that it could not be accurately counted. Ordered the following:—

R.	Sulph. Mag., drachmas duas.	
	Anti. Tart., grana duo.	
	Aquæ uncias octo.	M.
	Capt. coch. mag. omni semi-horâ.	

Seven, p.m.—Her countenance is now tranquil, the dark areola diminished, spasms less; she feels tolerably easy; no more vomiting, and the nausea diminished; she has taken a little tea.

20th, nine, a.m.—Her pulse is now 78 and steady, but very small; no more cramps; has had one rice-water stool during the night; she has passed no urine since the 17th.

R.	Hyd. Chlo., grana tria.	
	Pulv. Nit. Pot., grana duodecim.	
	Capt. statim.	M.

To take the mixture only every three hours.

Four, p.m.—She continued in the same state, and made no water. I then ordered a stimulating mixture with diuretics; after taking two doses the spasms returned, and in a more violent degree than I have since

seen them in any case : her arms, to the finger ends, were doubled up, and her thighs drawn up towards the abdomen. She was put on the antimonial mixture again, but as the spasms were dreadfully severe, I put her under the influence of chloroform ; this effectually relieved her ; an opiate was administered, and she passed a pretty good night.

21st.—She took the antimonial mixture to-day, but there was no change ; a catheter was passed, and no urine came away.

22nd.—She was not much altered in appearance, but was evidently getting weaker ; she had two fits of convulsions this day. In the afternoon a catheter was passed, and more than half a pint of clear urine was drawn off.

23rd.—The fits increased in frequency and violence ; in the intervals she was lethargic.

24th.—She died comatose.

This report is abridged from a very full report in my Case Book. This is the case before alluded to as the only unsuccessful one treated by tartar emetic ; as far as it went, it was the only thing done for her which did her any good. I have only given the report as far as it bears upon the question under discussion ; namely, the propriety of bleeding. At this time I would not have thought of bleeding any one in the depressed condition in which she was throughout the whole of her illness ; but from what I have since experienced in the treatment of cholera, I am satisfied that she ought to have been bled to three or four ounces on the evening of the 20th, when she had recovered a little from the great prostration which at first weighed her down, and when her pulse was 78 and steady.

The brain and its membranes were very much congested, by which her death was eventually occasioned ;

a bleeding at the period I have mentioned would have prevented, or at least have mitigated, this congestion.

CASE XXXIII.—Sept. 11. Jane Watson, ætat. 8. This at first was an ordinary case ; the symptoms were not very urgent. The calomel treatment was adopted, and at the end of two days she seemed quite well ; she was very carelessly nursed, and the next day was taken very ill again ; when she was seen, she was too low for venesection to be thought of ; she passed from collapse to a state of coma, and died on the fifth day. I am quite sure that if this child had been bled on the second day, or early on the third, she would have recovered.

CASE XXXIV.—September 15. M.Griffiths, ætat. 34. The history of this case is a short and melancholy one. At eleven, a.m., she called on me and complained of having had five or six watery stools ; she complained of nothing else. I scrutinized her countenance. The aspect was choleraic, but very slightly so. My first impulse was to send her home and go and bleed her ; that I did not do so I have often and deeply regretted, for I have little doubt that such a course would have saved her life ; on second thoughts, the symptoms being as yet of no great account, I reflected that such determined treatment might not be quite justifiable ; accordingly I ordered the astringent mixture to be taken every quarter of an hour, a sinapism to be applied to the abdomen, and directed her to go to bed and have bottles of hot water kept to her feet, intending to bleed her in the course of the day, if she did not improve ; unfortunately, in her case the disease advanced with such frightful rapidity, that when I called at two, p.m., she was in a state of utterly hopeless collapse ; she died at nine o'clock the next morning.

I have gone very fully into this question of bleeding, because my principal object in publishing this treatise

is to call the attention of the profession to the advantage to be derived from the use of the lancet, and I believe that I have adduced facts sufficient at least to warrant a careful trial of the remedy recommended.

There remains to be said a few words on the treatment by calomel alone ; this is, in fact, the treatment originally recommended by Dr. Ayre, of Hull, and on his recommendation become so popular.

We had seventy-two cases so treated, and of these, thirty recovered. This, at first sight, may appear a very small proportion ; but it must be borne in mind, that these were all cases of the very worst description, there being scarcely any reasonable ground to hope for the recovery of any of them. Why this mode of treatment was only adopted in these very bad cases was, because we found cases of less severity amenable to milder treatment.

Our experience in the use of calomel may be summed up under the following heads :—

1. We found the small doses of laudanum, recommended by Dr. Ayre to be given with each powder of calomel, of no use ; those patients to whom calomel alone was given did just as well.

2. We found it answer better, too, to give the calomel in larger doses, at rather longer intervals : it answered best given rubbed up in sugar, in doses of from three to five grains every quarter of an hour or half hour ; these doses were continued until dark-coloured stools were passed.

3. As a remedial agent in the treatment of cholera, I decidedly consider calomel entitled to the second place ; next to the use of the lancet, I know of no remedy to be at all compared to it in value.

4. When collapse was fully developed, and the use of the lancet inadmissible, I found the calomel treatment

the only one which did any good. How it acts on the system, during the stage of collapse, (when absorption seems as much in abeyance as any other of the vital functions,) I am not prepared to say; but there can be no doubt that it does exercise a wholesome influence; this is first evidenced by its allaying the rice-water vomiting and purging, and afterwards, when reaction is beginning, by its causing dark-coloured stools.

5. When the vomiting was excessive and obstinate, we often gave at once a scruple or half a drachm with the best effect; a repetition of the dose was sometimes necessary. This is quite in accordance with the experience of Dr. Johnson in India, who says, that "twenty grains of calomel will act as a *sedative*, and so far from griping or producing hypercatharsis, will soothe uneasiness, and rather constipate than purge."

Before concluding this subject I would say a few words on the use of two popular remedies, camphor and opium.

Camphor I made little use of; it appears to have been used with great success in several places. Those, however, who recommend it, say that it is only applicable to the first stage; now cases, which I got under treatment in that stage, I found could be very well managed by other means; and when I knew of one course of treatment which was generally successful, I did not think it justifiable to experiment on another. From what is recorded of it, I am inclined to think favourably of its use in cholera, but I would bleed in the first instance; it would then be often found that further treatment was unnecessary.

Of opium I cannot speak so favourably; in small doses, combined with astringents, it is of use in staying the evacuations in the beginning of the disease; in the second and third stages, small doses, combined with

antimony or acetate of lead, assist in allaying obstinate irritability of the stomach ; in the febrile stage, it is often required as an anodyne, to relieve cerebral excitement and cause sleep, just as it is used, when so indicated, in fever ; but its use in large and heroic doses, with the view of staying the disease and cutting it short, I unhesitatingly condemn as quite inadequate to the end proposed, even when pushed to extreme narcotism, and, moreover, as fraught with the greatest peril to the patient's life.

I will admit that many cases recovered under this treatment ; the disease running this course, perhaps five, six, or eight grains are administered either at once or in the course of two or three hours, the discharges from the bowels may or may not be lessened, but the patient is narcotized ; the spasms are not so much felt, perhaps they are really diminished by the antispasmodic action of the opium ; by and by, if there is an effort at reaction, the opium acts on the skin, and a profuse perspiration breaks out, and the patient *may* recover without severe encephalic fever : such is the course of a mild case treated by heroic doses of opium. The patient, who might be cured by much simpler means, gets well, but first must narrowly escape being poisoned. But what if the case be a more severe one ? We have known in Liverpool of cases proving fatal a few hours after the heroic dose had been administered. I have seen a patient fully narcotised, in fact, dying, as much from the effect of opium as of collapse, from whom the rice-water evacuations were still streaming. I have seen several who were quite narcotised, stupid and scarcely conscious of any thing but the cramps, which still made them writhe in bed, with their pupils closely contracted, in whom the symptoms of the disease were not at all abated. These patients, if they escaped being

poisoned in the first instance, and the danger of collapse in the second, had always to suffer severely from, and frequently fell victims to, the stage of encephalic fever. We generally found the cerebral symptoms in the fourth stage more obstinate and severe, in proportion to the quantity of opium which had been administered in the early stages.

In conclusion, I will briefly sum up the general indications of treatment in the order in which they arise throughout the whole course of the disease.

1. Simple diarrhœa (called premonitory) may be arrested by taking, in a draught, a drachm of solution of persesqui-nitrate of iron, with fifteen or twenty drops of laudanum. If the diarrhœa is accompanied with pain, it is better to give a dose of calomel and opium.

2. The first stage of cholera, distinguished from simple diarrhœa by the aspect especially, and perhaps by the pain at the præcordia and the rice-water purging. Although the choleraic aspect and the faint voice are the only pathognomonic symptoms of cholera, yet they are always accompanied *either* by the sense of pain and oppression at the præcordia, *or* by rice-water purging; generally by both; but one or other of these symptoms is present in every case, even from the first.

The general treatment will consist in keeping the patient warm in bed, applying artificial heat to the feet and knees. It is always advisable to apply a large sinapism over the abdomen and chest; it may be kept on a longer or shorter time according to the urgency of the case.

But, above all, now is the time for bleeding; patients bled at this period will *always* recover, except they be those very worst cases which get blue rapidly.

3. When the purging and vomiting are excessive, a few doses of the iron mixture will generally stop both;

in some cases it stops the diarrhœa, but not the vomiting.

Finding this occur from time to time, I adopted the practice of ordering it to be taken only until the diarrhœa ceased. To allay the vomiting, I then gave small doses of tartar emetic every half-hour.

4. When there is excessive vomiting without much purging I consider tartar emetic indicated, and I gave it at once instead of the iron mixture, combining it with small doses of acetate of potash. [I had first given it combined with sulphate of magnesia, as recommended by Dr. Billing, but I found that this sometimes irritated the bowels and increased the purging; on this account I used the acetate of potash, which I found to act better on the kidneys than the sulphate of magnesia did, without disturbing the bowels at all.]

When there was considerable diarrhœa, but vomiting still the more prominent symptom, I gave tartar emetic, with acetate of potash and tincture of opium.

5. We now come to the stage of collapse, and, at this period, our principal reliance must generally be on the *vis medicatrix naturæ*. Bleeding will save cases of that character already described in discussing the indications for depletion; but it will always be necessary to give stimulants freely afterwards.

For the worst cases, when the patient is blue and nearly pulseless, I believe that calomel is the only remedy of any use at all; when the rice-water evacuations continued through the stage of collapse, and were excessive, we found it useful to give enemata of acetate of lead and tincture of opium.

During collapse we also applied sinapisms to the abdomen and legs, and surrounded the patient with hot bricks, or bottles of hot water.

6. When a patient survives the stage of collapse, and

enters that of encephalic fever, the chief indications are to check the tendency to congestion and inflammation of the brain and membranes, and the restoration of the secretions to their normal condition. To fulfil these indications we must continue to give calomel until the patient passes bilious stools, and bleed from the arm as soon as the pulse rises and begins to feel somewhat firm. If the head symptoms come on quickly and severely, while the circulation is still at too low an ebb to permit bleeding from the arm, we must still, if possible, abstract blood from the back of the neck or from behind the ears, by cupping, as was done in the case of Kelly, (Case xxvi.)

To children, leeches may be applied, but, whenever it is practicable, cupping should be preferred; the requisite quantity of blood is removed more quickly, and, consequently, the effect is more nearly that of a general bleeding.

When coma supervenes rapidly, after extreme collapse, when the pulse has been almost imperceptible, and the prostration of strength extreme, bleeding will often be inadmissible; in such cases, counter-irritation must be had recourse to at once; blisters applied to the nucha, and cold applications to the head. When the epidemic was at its height, some cases passed with amazing rapidity through the different stages. I saw one lad, of sixteen, who had been taken ill at 4, a.m., with diarrhœa, collapsed at 7, a.m.; comatose at noon; at 1, p.m., he was blistered behind the neck; at 10, p.m., he was rallying; and the next day he was decidedly convalescent.

In those cases in which the symptoms of disorder of the encephalon persist, it is necessary to keep up counter-irritation by means of tartar emetic ointment or croton oil liniment; in several cases in which the

coma was profound, we succeeded in rousing the patients by applying a caustic solution of ammonia to the nucha and calves of the legs ; some of the blisters, raised by its application, degenerated into sores which healed slowly. Many of these cases recovered.

During this stage persistent vomiting was a very obstinate and troublesome symptom, to check it various remedies were used in different cases ; hydrocyanic acid, soda, creozote, calomel, tartar emetic, and acetate of lead.

The acetate of lead was of all the most effectual ; it was only in this stage of the disease, and for this purpose, that we found it of much use.

Tartar emetic could seldom be used, because the cases, in which the vomiting persists so obstinately, are generally those in which the prostration of the vital powers is very great, whereby the administration of tartar emetic is rendered inadmissible.

When reaction is decided, and the face flushed, tartar emetic and salines are necessary to keep down the febrile symptoms.

CHAPTER VI.

INFECTION.

Though I mean this treatise to be especially a practical one, it would, perhaps, be considered incomplete if no notice were taken of the long-disputed question of the contagiousness or non-contagiousness of cholera. I believe, if calmly considered, this dispute will be found to be one rather about words than facts. Many who deny generally the contagiousness of cholera, admit that, under certain circumstances, it may become so; and I apprehend that those who argue that it is essentially contagious in its nature, do not apply the term contagion to it, as they would apply it to scabies or variola, but, in fact, regard it as infectious in the same way that we speak of typhus fever or measles being so. Much of the difficulty attending the settlement of this question has arisen, I believe, from this misapplication of the term contagion.

My observation of many facts during the continuance of the epidemic has led me to the following conclusions:

1st.—That cholera is, to a considerable extent, an infectious disease; by which I mean that the exhalations from the body of a person affected with cholera, whether it be from the breath merely, or from the excretions likewise, have the power of so charging the atmosphere with morbid matter, particularly where ventilation is not attended to, that healthy persons breathing this atmosphere for some time, are liable to take the disease, this liability being in proportion to the extent to which they may be predisposed to it.

2dly.—That cholera is infectious to a less extent than most other epidemic infectious diseases; that is,

for example, that of a hundred persons exposed to the infection of cholera, a fewer number will take the disease than would take scarletina, variola, or fever, if severally exposed to the infection of these diseases, under like conditions.

3dly.—That when cholera is conveyed by infection from one person to another, that the disease in the infected party generally assumes the most malignant type, and that in this sense the infection of cholera is more deadly than that of any other disease: for example, let a given number of persons previously unaffected, be severally exposed to the infection of cholera, variola, scarletina, rubeola, or fever, and though there may be fewer cases of cholera resulting from the exposure than any of each of the other diseases, yet there will be a far greater proportion of deaths among those affected. These conclusions may be embodied in the following law, namely,—that cholera is not so generally infectious as other epidemic fevers, but when communicated by infection, engenders a very deadly form of the disease.

The extent to which cholera is infectious appears to connect it, by another link, with the class of epidemic fevers, as thus:—All fevers appear to be more or less infectious, in the same ratio in which previous attacks of each disease confer immunity against subsequent seizures. If we arrange them in the order of their virulence, we shall find that the immunity acquired by the patient is in exactly the same proportion.

1. VARIOLA.
2. SCARLETINA.
3. RUBEOLA.
4. FEVER, (TYPHUS.)
5. CHOLERA.

It is scarcely possible for one not previously infected, to be exposed to the infection of variola and to escape the disease, and I believe there is no case on record of any one being twice affected with variola. Scarletina

stands next in the order of virulence, and in this case the security against future attacks is not so decided as in the case of small-pox, as there have been instances of scarletina being taken a second time. The infection of rubeola is perhaps not so virulent as that of scarletina, and we hear more frequently of cases occurring a second time in the same individual. Many persons have fever twice, and even three times, though I believe that Dr. Watson is quite right in arguing, as he does, that an attack of typhus or continued fever generally confers immunity against future seizures. Now a much greater number of persons, after exposure to infection, escape fever than either scarletina or measles.

Lastly, the security conferred by cholera, if there be any at all, is inconsiderable, as we frequently hear of persons having attacks of cholera twice, and even three times.

That, under some circumstances, cholera is communicable by one person to another, I think may be considered now as established by a number of incontrovertible facts.

Any additional cases are scarcely required to strengthen this argument; however, I will conclude with a few examples which appear to me very decisive.

At first, the cholera made its appearance in my neighbourhood exactly as other epidemic diseases do; a case occurred in one street; after a short interval in another at a little distance; again in a third; some time passed before any case occurred which could be traced to any particular exposure to infection; this lasted for some time.

1. Margaret James, an old woman, died of cholera on the 16th of June. She lay in a room without any fireplace, and the door and window beside each other at one end. There was a large family in the house: of these, two girls (after the old woman's remains were

removed) slept in this room. Now, if cholera be infectious, here were certainly conditions likely to bring into play this feature of the disease,—a person dying in a small apartment without any contrivance for ventilation, and what was the result?—One of these young women took ill of cholera on the 24th of June; the other on the 26th. One died—the other recovered.

J. Taylor died of cholera on the 8th of July; her child died on the 12th; some of the children were then removed to the house of a relative several streets off; another took ill there on the 14th, and on the 17th a child of the family to which the other children had been removed.

There were three several instances of women nursing young children ill of cholera; though warned frequently to be more cautious, they persisted in keeping the children on their knees for hours, fondling and hanging over them;—they all three died of cholera of the most malignant character two days after the children. There was another instance of a man being carried off in a few hours, who had hung very much over his wife while attending to her when she was dying of cholera. These were the most striking examples, but there were many other instances of persons being attacked, who took no pains to guard against unnecessary exposure to infection. I continually warned the families of my patients to guard against all danger by attending to ventilation and cleanliness, and I particularly charged the women to avoid inhaling the breath of the patients. When a bad case occurred in any house, and these directions were attended to, there was seldom a second case; when they were neglected, cases followed each other until there were four or five, and (in one instance) seven cases in one house.

There was one family in which four children were ill; the house was dirty, crowded, and badly ventilated;

the mother was particularly careful to avoid exposing herself to infection, and she escaped. This house was the first in a long court, with six houses on each side; the families in the other houses avoided all intercourse with the infected family, and the disease did not spread in the court; but one lad, from the top house on the other side, would go in to see the sick lads continually; he took cholera before the other children were well, and died on the third day.

In Liverpool, the popular prejudice was, that the disease was not either infectious or contagious; this opinion was founded on the widely-circulated dogmatical assertion of the Board of Health. Many lives were sacrificed by the unfortunate confidence with which the public received this assertion.

As far as hygienic precepts and practical precautions are concerned, I believe these jarring opinions may be reconciled, by taking a middle course, as recommended by Dr. J. Johnson twenty-five years ago, when writing on the tropical fevers, that is, by separating the sick from one another, as well as from the healthy, and avoiding crowding them in ill-ventilated hospital wards.

Discussing the question of contagion in reference to fever, after quoting several authorities, Dr. Johnson says,—“ Yet here, as in most other instances, truth lies between the extremes. As far as my own observations and judgment could guide me, I have been led to conclude, that the endemic fevers alluded to are *not* contagious, till a certain number of patients are confined together, under certain circumstances, when the effluvia *may* render them so. If, for instance, a man is seized with fever from greater predisposition, or from greater exposure to the causes enumerated, than his companions, he will not communicate the disease to another, who may sleep even in the same chamber, where common cleanliness is observed. But, on the other

hand, if great numbers are attacked at the same time, and confined in the sick berths of ships, or in ill-ventilated apartments, in hammocks, cots, or filthy beds, it is nearly certain that a febrific atmosphere will be found, (without an attention to cleanliness and ventilation scarcely compatible, or at least hardly to be expected in such situations,) which spreads a disease, *wearing the appearance of the prevailing endemic*, but having a dangerous character superadded, namely, the power of reproducing itself, in other subjects, both independent of, and in conjunction with, the original endemical causes. This circumstance reconciles the jarring evidences which have long kept the public opinion in suspense. It has been urged that we ought to err on the safe side, by considering it contagious, and guarding, accordingly, by early separation. But this plan is not without its disadvantages, and, if I am not greatly mistaken, I have seen it produce what it was meant to prevent, namely, by confining all who had any symptoms of fever in one place; when, as on board a ship, in a tropical or any climate, it is exceedingly difficult, if not impossible, to prevent the generation of a foul atmosphere, and the impregnation of bedclothes, &c., with the effluvia from the diseased secretions and excretions of the patients. On the other hand, I have seen both sides of the main deck nearly filled with fevers of the country, where screens and other means of separation could not be obtained, or, rather, were not insisted on, and yet no bad effects followed; while under similar circumstances, when there were fewer sick, and all imaginable pains taken to insulate them, attendants have been seized, and other symptoms indicative of contagion and virulence, which, while they seemed fully to justify the precautions used, were probably owing to them alone. These hints may not be entirely unworthy of attention, inasmuch as they

show us how easily we may be deceived, and how positive we may be in our errors. They likewise show that free ventilation and cleanliness may, in general, be confided in, between the tropics, when seclusion is inconvenient or impracticable ; and *that separation of the sick from one another*, as far as possible, is a duty not less incumbent than that of the communication between them and the healthy."

Dr. Johnson seems not to consider a fever as strictly contagious or infectious, unless there is positive evidence of its being communicated by one party to another ; but I would say that the disease is in its nature infectious if it is ever proved, in any instance, to be communicated by one person to another ; practically it may not, if care be taken to dilute the poison, by cleanliness and ventilation, so as to render it too weak to exercise a deleterious influence.

I now bring this brief work to a conclusion, and with diffidence submit it to the judgment of the profession, not as doubting the soundness of the views which I have adopted and recommended, but mistrustful of the ability with which they are enforced.

Confident of the superior efficacy of the practice, and believing that the principles are just upon which I have founded it, I beg that it may be deliberately considered and fairly tried, whenever, unhappily, a return of the epidemic may afford the opportunity.